

AIR

GRAPHIC SURVEY

N-12836-E Section 5

OF RADIO AND RADAR EQUIPMENT USED BY THE ARMY AIR FORCES

REMOTE CONTROL AND TELEVISION EQUIPMENT



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REF ID: A62166

Instructor's Readiness Document

Figure 12836-E (File No. _____)

M. J. Murphy

Date 13 Aug 46

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Wright Field

Air Materiel Command

Dayton, Ohio

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GRAPHIC SURVEY of Radio and Radar Equipment Used by the Army Air Forces

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Foreword

Purpose:

This "Graphic Survey of Radio and Radar Equipment used by the Army Air Forces" is intended to furnish authorized personnel with graphic and narrative data relative to description, electrical and physical characteristics, purpose, and tactical employment of the radio and radar equipment used by the Army Air Forces.

Restriction:

The Graphic Survey is not authorized as a basis for procurement, storage, or issue, but is prepared only for information and guidance of research, development, procurement, storage, issue, and staff and planning activities.

Scope:

This publication is intended to cover all active equipment in use and in production. Publication is accomplished in a series of separate sections in order that reproduction and dissemination may be effected economically and expeditiously.

Format:

Permanent binder covers are not furnished with the various sections of the Graphic Survey, but the pages of each section are printed on 8-1/2 x 11-inch paper and punched for the standard AAF three-hole binder, (binder, loose-leaf, 3 post, stock No. 8700-043800), commonly known within the AAF as "Technical Order Binder." With a few exceptions, data concerning each equipment is presented on two pages. The first page contains a description and information relative to use, installation, and electrical characteristics; the second page, photographs of the various components and physical weights and dimensions. Within each section, the equipments are arranged alphabetically by official nomenclature and type designation.

Suggestions:

Suggestions are invited for improvement of form, content, or to otherwise increase the ultimate utility to the user within the scope and purpose of this publication. Comments should be addressed to the Commanding General, Air Materiel Command, Wright Field, Ohio, Attention: TSELT-1D1, for consideration.

Security:

The Graphic Survey is classified "Confidential" because of the broad scope of the equipment covered in each volume and the confidential classification of many of the equipments. Each addressee will be responsible for maintaining the security of his copies in accordance with the provisions of AR 380-5. Security classification of each individual equipment at the time of publication will be indicated on the pages relative to that equipment.

Distribution:

Requests relative to distribution of this publication should be addressed to Commanding General, Air Materiel Command, Attention: TSELT-1D1. Revisions and additions are forwarded periodically to original addressees in order that all copies may be kept up to date. Each copy has a serial number which is recorded on a master distribution file index.

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Authority:

Preparation, publication and distribution of the Graphic Survey is accomplished in accordance with letter, Headquarters, AAF (AFDMA-2F), dated 5 April 1945, subject "Graphic Survey of Radio and Radar Equipment Used by the AAF." AAF report clearance No. AAF-MD-E89 has been assigned.

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Section 5. Remote Control and Television Equipment

NOMENCLATURE	DESCRIPTION	TYPE*	SECURITY CLASSIFICATION
AN/APW-1	Radar Set (Control Receiver and Beacon)	Limited Standard	C
AN/ARW-1 AN/ARW-9	Radio Control Receiving Equipment Radio Set (Remote Bomb Release Transmitting Equipment)	Standard Standard	U U
AN/ARW-10	Radio Set (Remote Bomb Release Receiving Equipment)	Limited Standard	U
AN/ARW-18	Radio Transmitting Set (Radio Control)	Standard	U
AN/ARW-26 AN/ARW-33()	Target Control Receiving Equipment Radio Transmitting Set (Radio Control)	Standard (Pending)	U C
AN/ARW-38()	Radio Transmitting Set (Radio Control)	Standard	R
AN/AXR-1	Radio Receiving Set (Television)	Standard	U
AN/AXT-2	Radio Transmitting Set (Television)	Standard	U
AN/CRW-2	Radio Receiving Set (Radio Control)	Limited Standard	U
AN/CRW-7	Radio Receiving Set (Radio Control)	Standard	U
AN/TRW-1	Target Control Transmitting Equipment	Standard	U
AN/VRW-1	Target Control Receiving Equipment	Standard	U
RC-56-A RC-57-B RC-64-() RC-65-()	Target Control Transmitting Equipment Target Control Receiving Equipment Target Control Receiving Equipment Target Control Transmitting Equipment	Standard Standard Standard Standard	U U U U

* For definition of Type classification terms see AR 850-25.

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AN/APW-1

Radar Set AN/APW-1 is radio control receiving equipment designed for installation and use in the tracking and flight control of JB-2 pilotless aircraft missiles. This unit combines the functions of an airborne beacon transponder (an adaptation of AN/APN-19) with that of target-control receiving equipment. A Radio Set SCR-584-M, modified for longer range and variable prf, is the control station that may be used to track and control the missile's flight.

Remote control of the missile may be effected from the SCR-584-M by positioning of the control mechanism to the various control positions. This will result in modulation of the SCR-584-M interrogation signal and transmission to the missile one of four tones (prf) for each movement or function that may be desired ("up", "down", etc.). Fifteen control functions result from application of the four tones (prf) as follows: one tone (prf) may be used to actuate the step switch to set up one of three pairs of flight functions; another tone (prf) may be used to actuate the transponder; the other two tones (prf) may be used to select and control one of the flight functions ("up", "down", etc.) set up by the step switch.

Receiver Transmitter Unit RT-86/APW-1, functions both as receiver and transponder, and includes an audio-filter-selector circuit for discrimination between the various tones received. The output of the selector circuit is relayed to servos that actuate the aircraft control surface mechanisms, or to relays that actuate the transponder. Actuation of the transponder results in the transmission to the SCR-584-M of coded signals that make possible the tracking of the missile.

Radar Set AN/APW-7 is similar to AN/APW-1 except that one audio filter channel has been modified to respond to a slightly different pulse repetition frequency.

The following items of test equipment are for maintenance of AN/APW-1 at equipment locations:

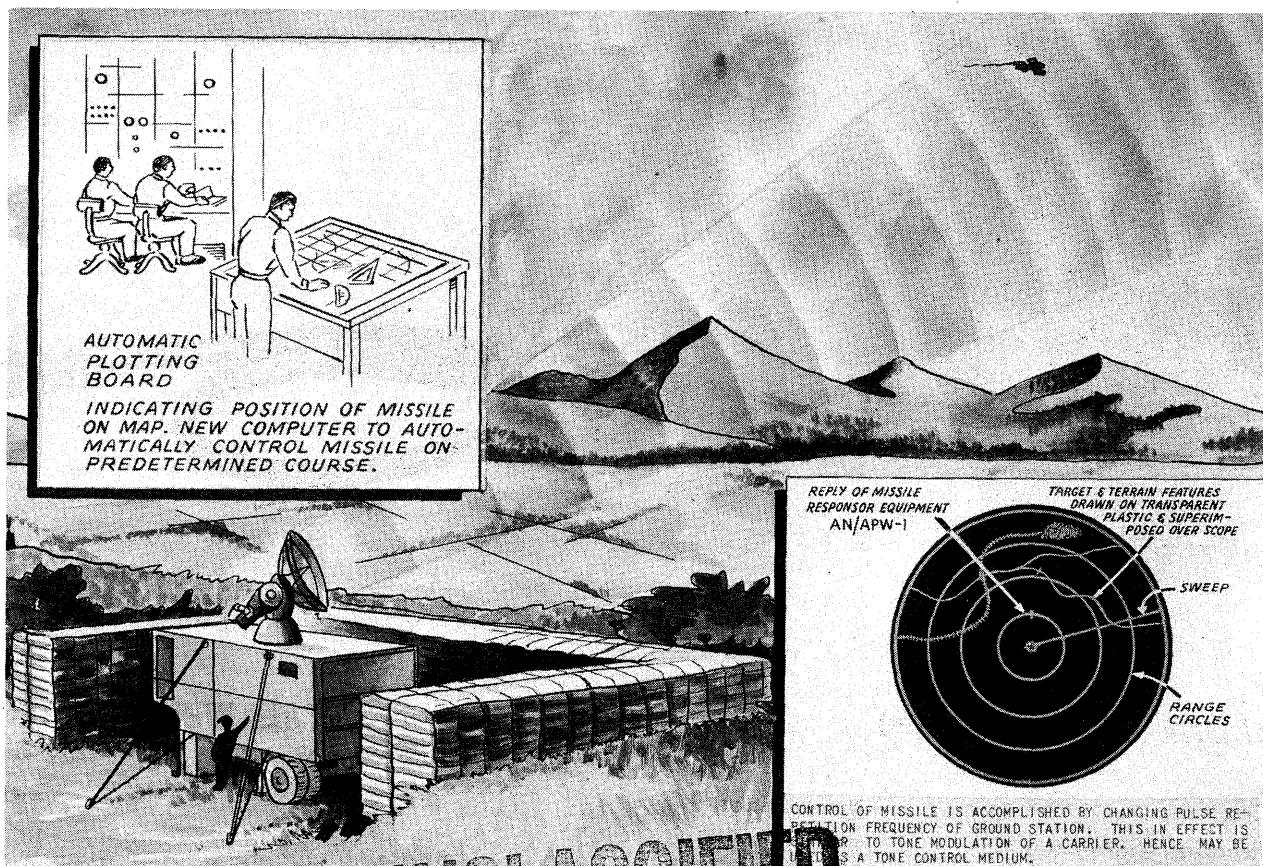
TS-117/GP	Wavemeter
TS-125/AP	Power Meter
TS-155C/UP	Signal Generator
TS-239/UP	Oscilloscope
TS-352/U	Multimeter
TS-382/U	Audio Oscillator
TS-414/U	Dynamotor Test Set
I-139/A	Test Set
I-177	Tube Tester

Note: additional test equipment for maintenance of this equipment is still in development stages.

CO-AN 16-30APW1-2-M is the HMI for AN/APW-1.

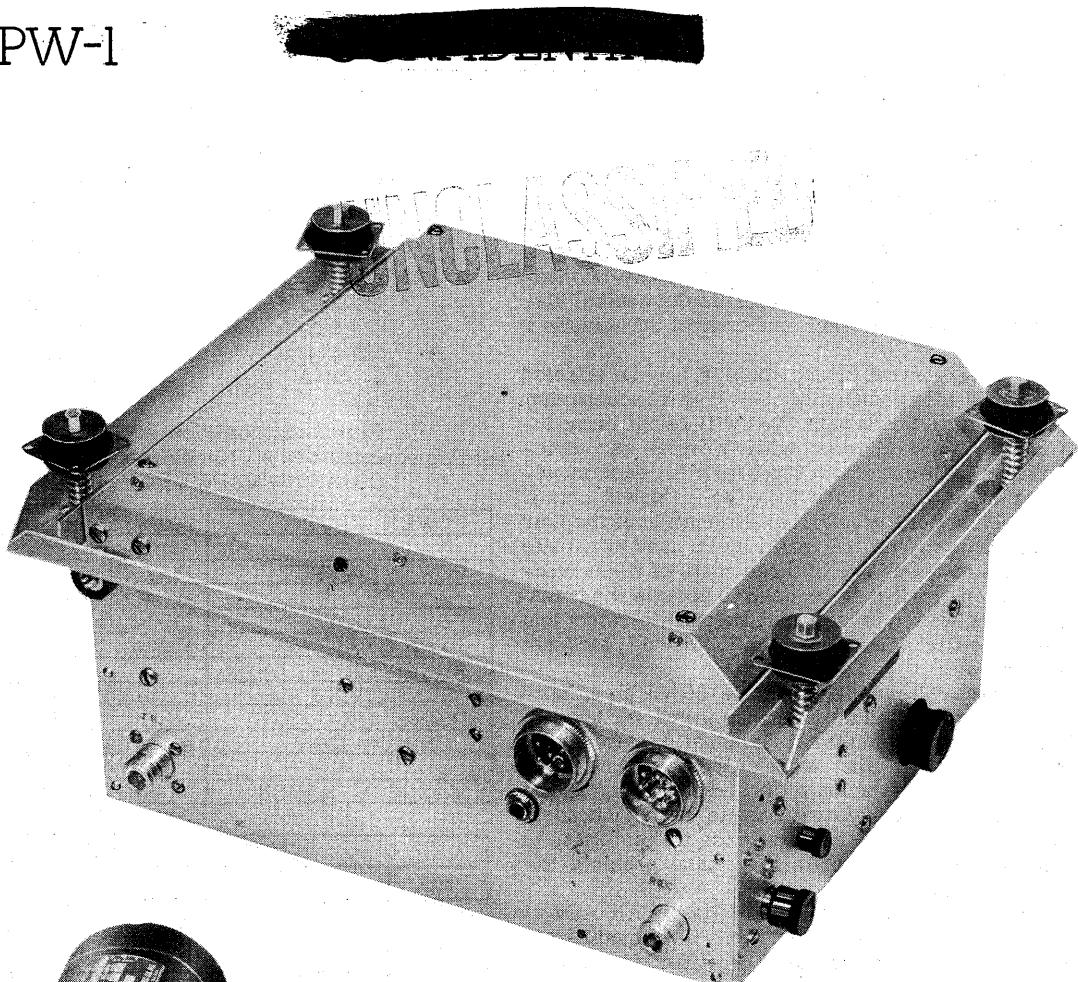
POWER INPUT	200 w, 28 v, d-c (supplied by missile)
POWER OUTPUT	Peak, 75 w
AVERAGE	Average, 40-70 milliwatts
FREQUENCY	2700-2900 Mc
TYPE OF SIGNAL	Pulse
RECEIVER	
SENSITIVITY	0.05 microwatts
PULSE DIS-	
CRIMINATION	Accepts pulse durations of 2 microseconds or more
MAXIMUM RANGE	95 miles at 7000'

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
6	7F8	3	2D21
2	6SN7	1	2C40

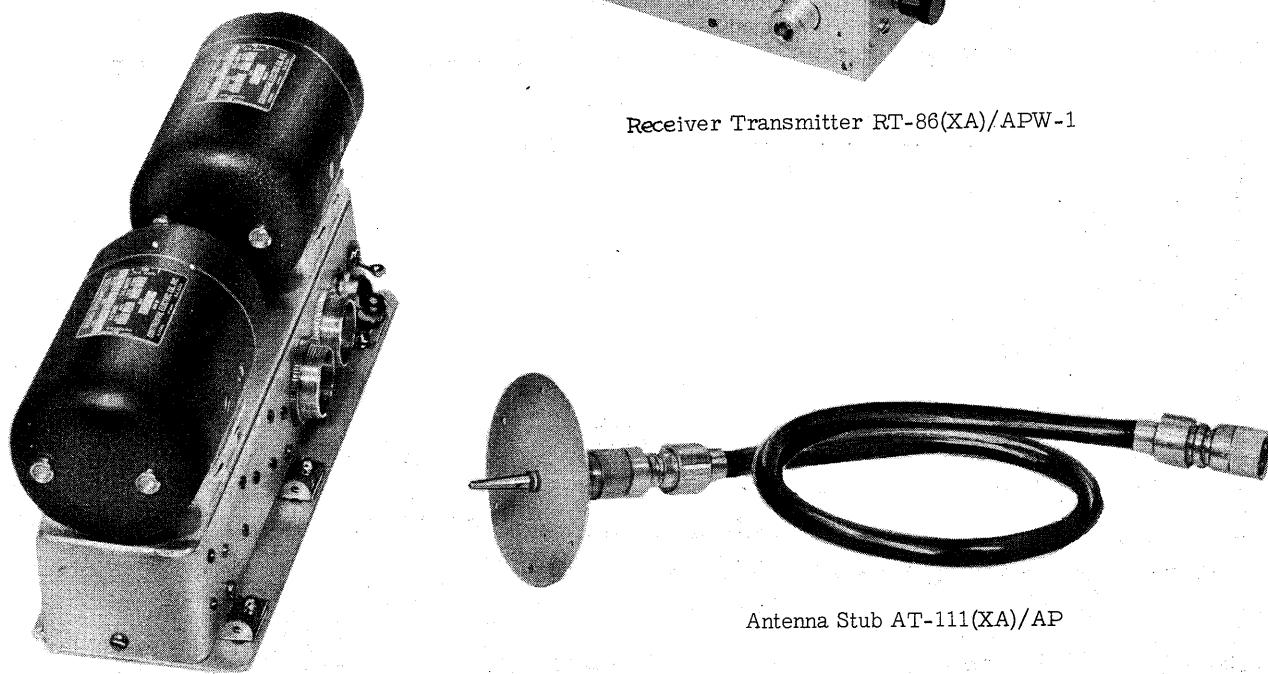


Radar Set AN/APW-1 is a radio control receiving set that may be used in conjunction with Radio Set SCR-584-M (ground control equipment) to track and control the flight of pilotless aircraft.

AN/APW-1



Receiver Transmitter RT-86(XA)/APW-1



Dynamotor Unit DY-33(XA)/APW-1

RADAR SET AN/APW-1

TOTAL WEIGHT 25 LB

Component	Nomenclature	Size	Weight
Receiver Transmitter	RT-86()/APW-1	7" x 9" x 11"	12 Lb
Mounting Unit	MT-434/APW-1	2" x 11" x 13"	1 Lb
Dynamotor Unit	DY-33/APW-1	3" x 5" x 11"	7 Lb
Mounting Plate	MT-435/APW-1	1" x 3" x 11"	
Antenna Stub	AT-111/AP	3" dia . 2" long	

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AN/ARW-1

Radio Control Receiving Equipment AN/ARW-1 is the F-M receiving equipment of a system designed for remote control of BQ-7 and BQ-8 war-weary aircraft for offensive bombing missions.

Used in conjunction with Radio Transmitting Set AN/ARW-18, remote control may be effected from ground to air, or air to air, up to 18 miles (normal range). The effective control range may be extended to 75 miles through use of an RF amplifier unit (AM-33/ART) at the transmitter (AN/ARW-18). Target Control Receiving Equipment RC-64-Z is similar to this equipment in construction and operation, however, tactical application is entirely different.

Manual operation at the transmitter of the Control Box (BC-756) will result in the transmission to the plane of certain tones for each of the (ten) control movements or functions that may be desired ("up", "down", etc.). Receiver-Selector (BC-617-T2) includes an eight channel audio filter selector circuit for discrimination between the various tones received. Relay Unit BC-622 passes control voltages to the automatic pilot from the receiver output. Relay Box BC-935 may be used in the control and operation of television equipment that may be installed in the plane when required. Although the altitude of the aircraft is normally controlled by the altimeter equipment in the plane, the altimeter setting may be overridden when necessary through Relay Box RE-20/ARW-1.

AN/ARW-1A and AN/ARW-1B are similar to AN/ARW-1 with the following differences: AN/ARW-1A includes Radio Receiver and Selector BC-617 (ten channel) and Radio Control Box BC-491 instead of BC-617-T2 and BC-491-T2, AN/ARW-1B includes Radio Receiver and Selector R-154/ARW-1 instead of BC-617-T2.

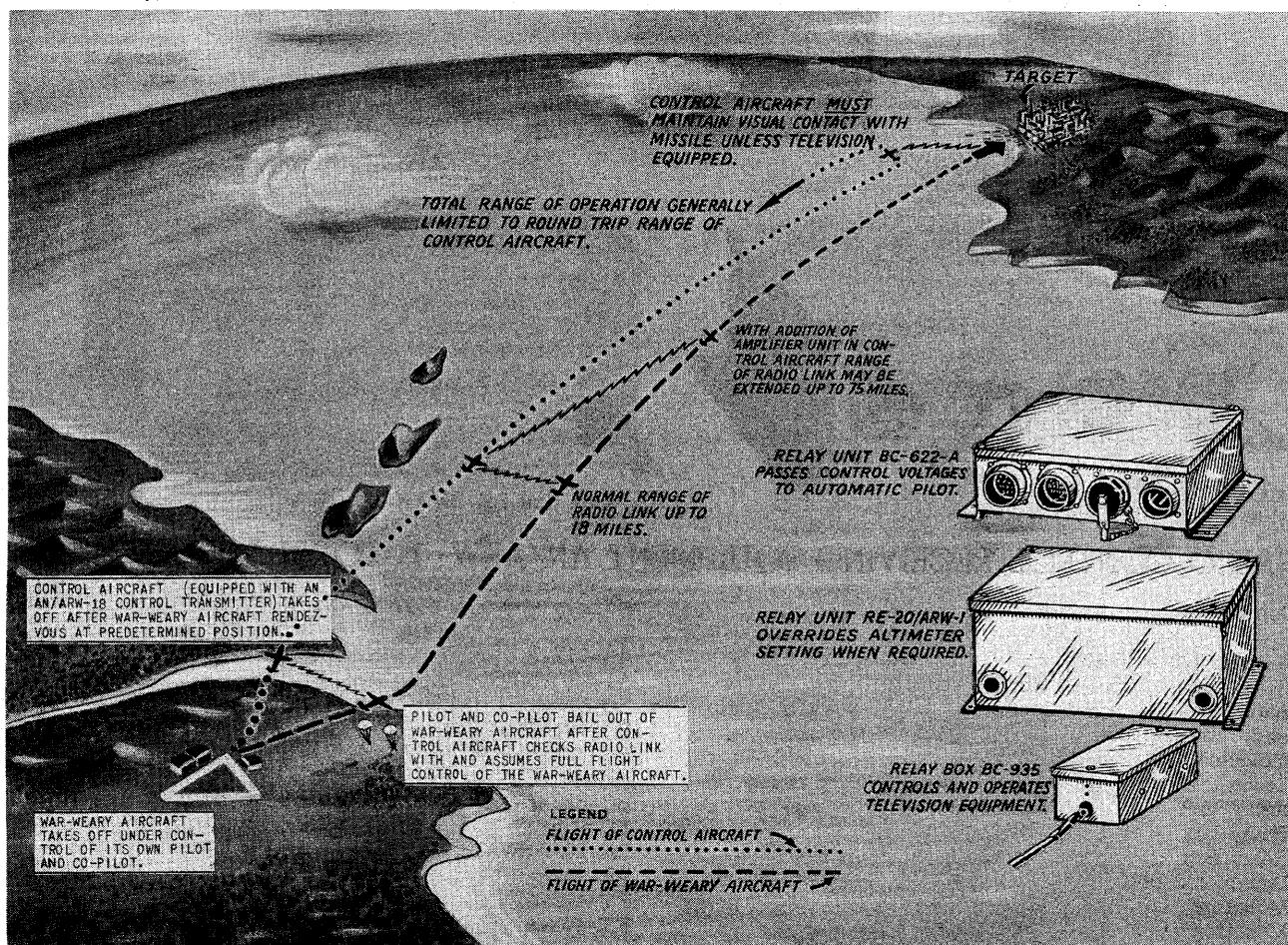
The test equipment for maintenance of these systems consists of the following:

Test Set	IE-72
F-M Signal Generator	I-208
Audio Oscillator	Hewlett Packard 200-C
F-M Monitor	Doolittle Radio Type FD-10
Vacuum Tube Voltmeter	Hickok 110
Test Set	I-56-K
Oscilloscope	Dumont 241

CO-AN 16-30ARW1-2-M is the HMI for AN/ARW-1.

POWER INPUT	250 w, 22 - 28 v, d-c
FREQUENCY	30 - 40 Mc
TYPE OF SIGNAL	F-M
RANGE	18 miles (AN/ARW-18 without amplifier) 75 miles (AN/ARW-18 with amplifier)
RECEIVER SENSITIVITY	15 Microvolts

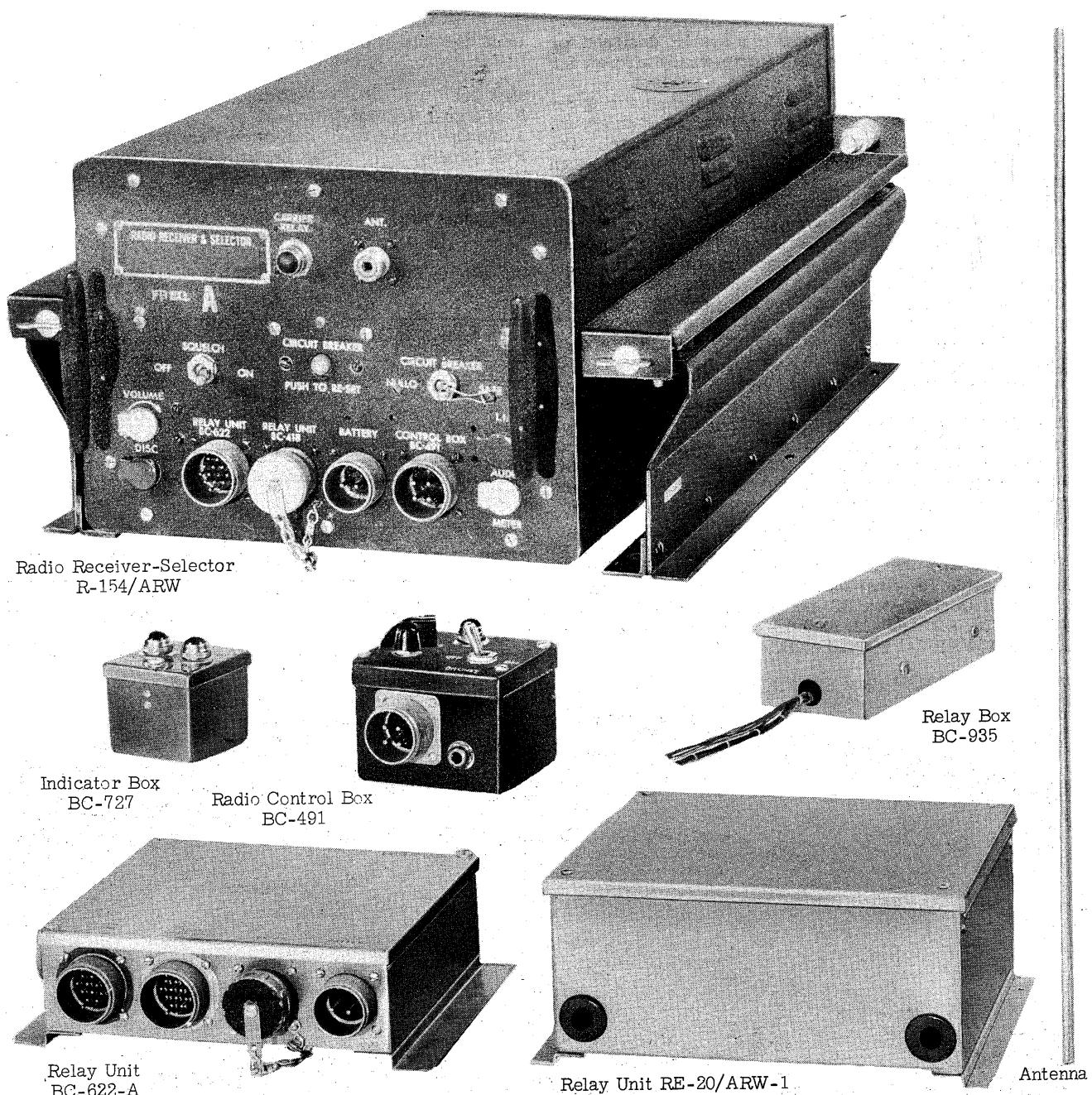
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3	12SK7	1	6H6
1	12SA7	10	12SN7GT
2	12SJ7		



Radio Control Receiving Equipment AN/ARW-1 is the F-M receiving equipment of a system designed for remote control of war-weary aircraft as guided missiles.

AN/ARW-1

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RADIO CONTROL RECEIVING EQUIPMENT AN/ARW-1 TOTAL WEIGHT 85 LB

Component

Antenna (30 - 35 Mc)
or Antenna (35 - 40 Mc)
Radio Receiver and Selector
Radio Control Box
Indicator Box
Lamp
Relay Unit
Relay Box
Relay Box
Dynamotor Unit
Mounting
Mounting
AN/ARW-1 also includes plugs, cables, switches, etc.

Nomenclature	Size	Weight
AN-117-A	6' long	1 Lb
AS-89/ART		1 Lb
BC-617-T2	14" x 22" x 9"	35 Lb
BC-491-T2	4" x 3" x 4"	1 Lb
BC-727		*
LM-49		*
BC-622-A	7" x 7" x 3"	5 Lb
BC-935	3" x 6" x 2"	
RE-20/ARW-1	9" x 8" x 4"	
PE-94-B		36 Lb
FT-442-A		2 Lb
FT-462-A		2 Lb

* Less than 1 lb.

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AN/ARW-9

Radio Set AN/ARW-9 is the transmitting equipment of an airborne remote control bomb release system designed to effect simultaneous release of bombs from all airplanes in a formation. This equipment is considered to be especially suitable for bombing targets which require concentrated bombing patterns such as factories, railroad yards, warehouses, etc. Overall utility of this system is increased by use of advanced type of radar bombing equipment in leading aircraft.

Transmitter Modulator BC-1158 (also part of RC-186) may be preset on any one of 25 frequencies, and tone modulated by either of two audio control tones determined by the positioning of Control Box BC-1156-A to either one of the two control positions.

Remote Control of the bomb release system of any convenient number (usually twelve) of aircraft (equipped with AN/ARW-10, may be effected from one airborne transmitter (AN/ARW-9), by manipulation of the Control Box (BC-1156-A) to either one of the two control positions. This will result in transmission to the "controlled" station of a certain tone for each of the (two) control effects that may be desired. Reception of either one of the two tones by the Receiving Equipment (AN/ARW-10) results in re-laying of actuating voltages to the bomb release mechanism.

Test equipment for maintenance of this system

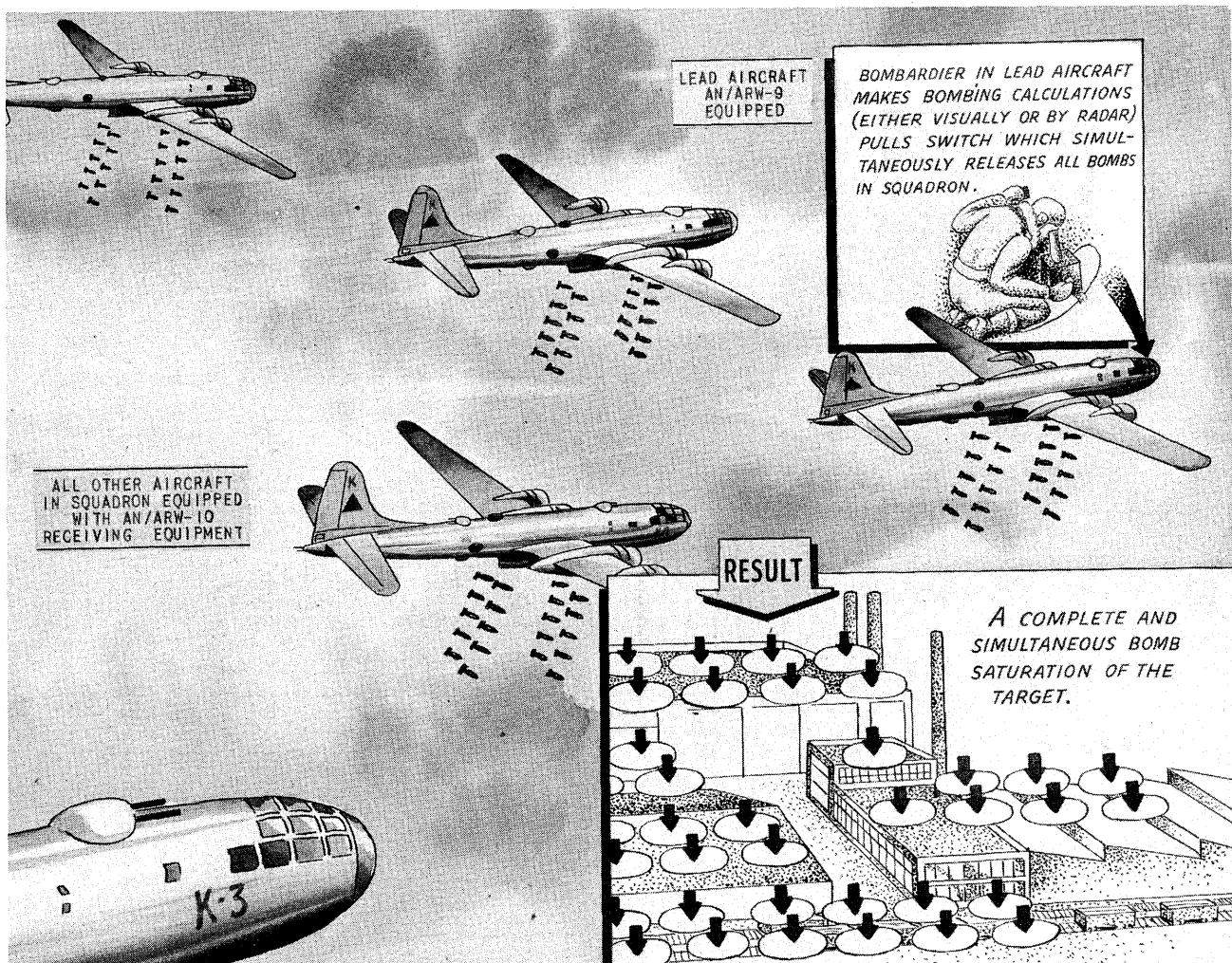
consists of the following:

(2nd echelon maintenance)	Multimeter
TS-297/U	Multimeter
(3rd & 4th echelon maintenance)	R-F Wattmeter
TS-297/U	Frequency Meter
TS-118/AP	Oscilloscope
TS-174/U	Audio Oscillator
TS-239/UP	Voltmeter
TS-382/U	Dynamotor Test Set
TS-375/U	Tube Tester
TS-414/U	
I-177	

AN 08-30ARW9-2 is the HOI for AN/ARW-9.

POWER INPUT	340 w., 24-28 v, d-c
POWER OUTPUT	12 w
FREQUENCY	53 - 95 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	Line of Sight

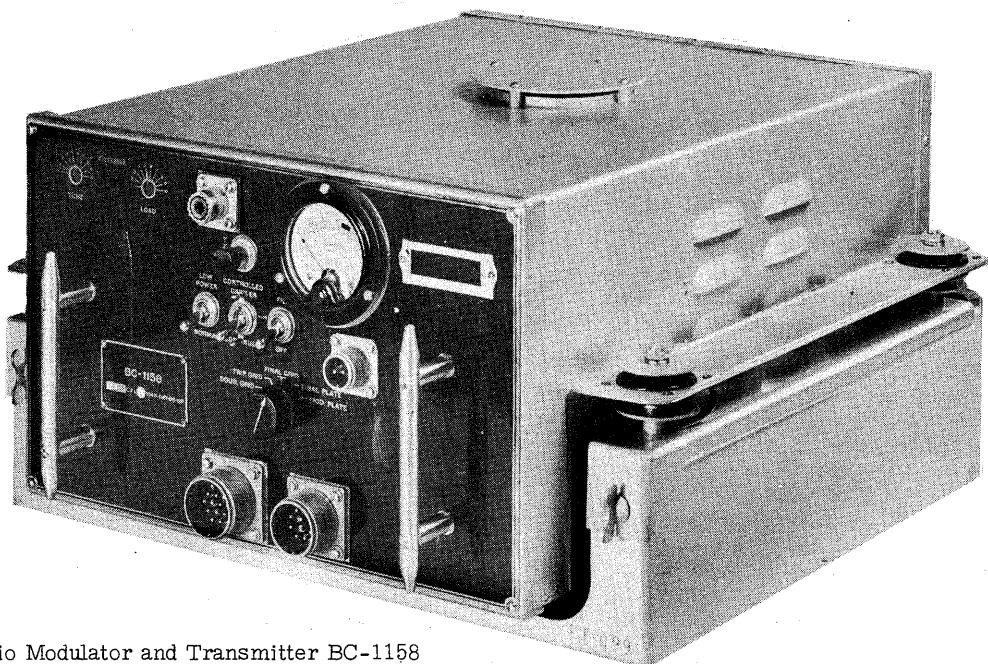
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
4	815	10	12SN7GT



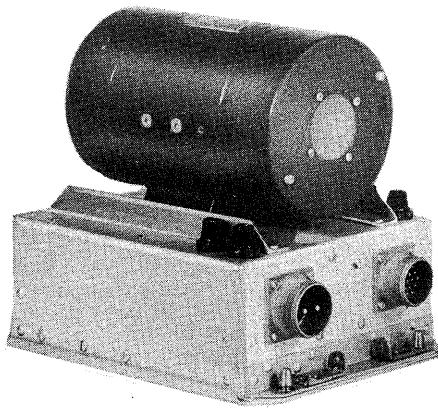
Radio Set AN/ARW-9 (transmitting equipment) is part of an airborne remote control bomb release system which, operating in conjunction with Radio Set AN/ARW-10 (receiving equipment), permits the bombardier in the lead aircraft to release the bombs of an entire squadron simultaneously. This provides a bombing pattern of less than a 1000' in diameter whereas the individual release of bombs by each aircraft bombardier would promote a bombing pattern as great as 5000' in diameter. Tests show that bombs released by this equipment drop within one-half second of each other.

AN/ARW-9

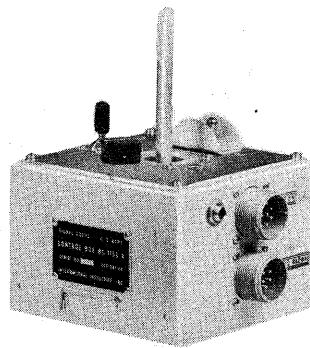
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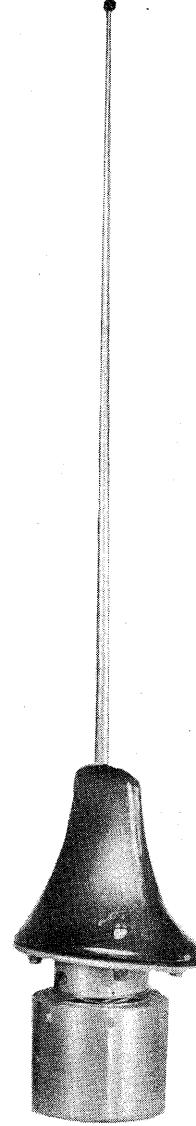
Radio Modulator and Transmitter BC-1158



Dynamotor Unit PE-186



Control Box BC-1156-A



Antenna Assembly
AS-150/ART

RADIO SET AN/ARW-9

Component	Nomenclature	Size	Weight
Antenna System	AS-150/ART	30"	
Antenna System	AS-161/ART		3 Lb
Antenna Base	AB-29/ART		
Antenna System	AS-97/ART	11"	
Case	CS-151	11" x 12" x 2"	
Dynamotor Unit	PE-186	7" x 8" x 10"	18 Lb
Indicator Box	BC-727		*
Mounting B	FT-497		*
Mounting	FT-499	4" x 14" x 16"	*
Radio Frequency Cable	RG-8/U		
Radio Modulator and Transmitter	BC-1158	17" x 9" x 15"	32 Lb
Relay Unit	RE-22/ARW-9	4" x 3" x 2"	1 Lb
Tuning Unit	TU-75	7" x 4" x 15"	4 Lb
Lamp	LM-49 (3 ea)		*
Crystal Unit	CR-1A/AR (25)		
Control Box	BC-1156-A	7" x 6" x 5"	3 Lb

*Less than 1 lb.

Also includes plugs, cables and adapters etc.

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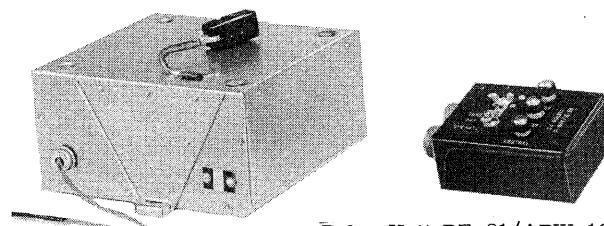
AN/ARW-10
(and AN/ARW-10A)

Radio Set AN/ARW-10 is the receiving equipment of an airborne remote control bomb release system designed to effect release of bombs simultaneously from all airplanes in a formation. This equipment is considered to be especially suitable for bombing targets which require concentrated bombing patterns such as factories, railroad yards, warehouses, etc. Overall utility of this system is increased by use of advanced type of radar bombing equipment in leading aircraft.

Remote control of the bomb release system of any convenient number (usually twelve) of aircraft (equipped with AN/ARW-10), may be effected from one airborne transmitter (AN/ARW-9) by manipulation of the Control Box (BC-1156-A) to either one of the two control positions. This will result in transmission to the "controlled" station of a certain tone for each of the (two) control effects that may be desired. Receiver R-74/CRW-2 (also the major component of AN/CRW-2) a superregenerative receiver that may be preset on any one of five different frequencies, includes a two channel audio-filter-selective circuit and associated relays. The selective circuit discriminates between the two control tones received and relays the resulting control voltages to the bomb release actuating equipment.

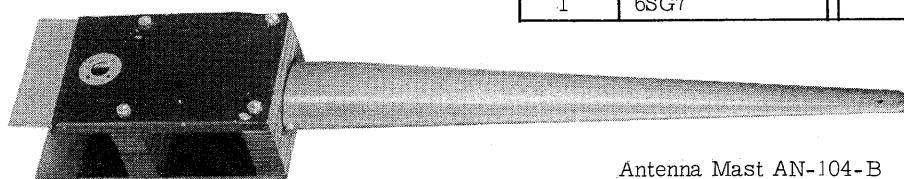
Radio Set AN/ARW-10A contains an improved radio receiver (R-150/CRW-7) with a frequency range of 66 to 93 Mc, and an improved relay unit (RE-33/ARW-10 A). AN/ARW-10A is designed to replace AN/ARW-10.

AN 08-30ARW10-2 is the HOI for AN/ARW-10, and AN 16-30ARW10-3 is the HOI and AN 16-30/ARW10-5 is the HMI for AN/ARW-10A.



Relay Unit RE-21/ARW-10

Radio Receiver R-74/CRW-2



Antenna Mast AN-104-B

RADIO SET AN/ARW-10

Component	Nomenclature
Radio Receiver	R-74/CRW-2
Relay Unit	RE-21/ARW-10
Antenna Mast	AN-104-B
Tuning Unit	TN-43/CRW-2
Tuning Unit	TN-44/CRW-2
Lamp	LM-49 (3 ea)

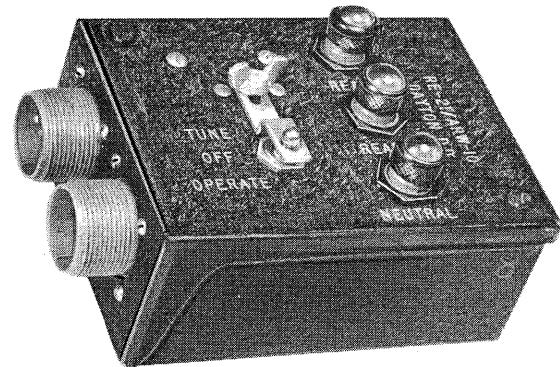
RADIO SET AN/ARW-10 A

Radio Receiver	R-150/CRW-7
Relay Unit	RE-33/ARW-10
Antenna	AN-104-B

AN/ARW-10, 10A also include plugs, cables, adapters etc.

* Less than 1 lb.

April 1946



Relay Unit RE-21/ARW-10, installed in the bombardier's position, provides visual indication of operation and emergency on-off switch in case of equipment failure.

Test Equipment for maintenance of these systems consists of the following items:

AN/ARW-10	Test Box
TS-154/CRW-2	Signal Generator
GR-804-CS-1	Audio Oscillator
Jackson 652	Frequency Meter
TS-174/U	
AN/ARW-10A	Test Equipment
AN/CRW-5	

POWER INPUT	78 w, 24 - 28 v, d-c
FREQUENCY	AN/ARW-10: 80 - 90 Mc AN/ARW-10A: 66 - 93 Mc
TYPE OF SIGNAL	Modulated C-W
RECEIVER SENSITIVITY	R-74/CRW-2: 30 - 200 microvolts R-150/CRW-7: 50 microvolts

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	AN/ARW-10	6	AN/ARW-10A
3	6SN7GT	2	6AG5
1	6SL7GT	1	6J6
1	6J5		6AL5
1	6SG7		

TOTAL WEIGHT 20 LB

Size	Weight
4" x 8" x 8"	13 Lb.
5" x 3" x 2"	1 Lb.
	3 Lb.
	1 Lb.
	1 Lb.
	*

TOTAL WEIGHT 22 LB

16 Lb.
1 Lb.
3 Lb.

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AN/ARW-18

Radio Transmitting Set AN/ARW-18 is the F-M transmitting equipment of a system designed for remote flight control of BQ-7 and BQ-8 war-weary aircraft for offensive bombing missions.

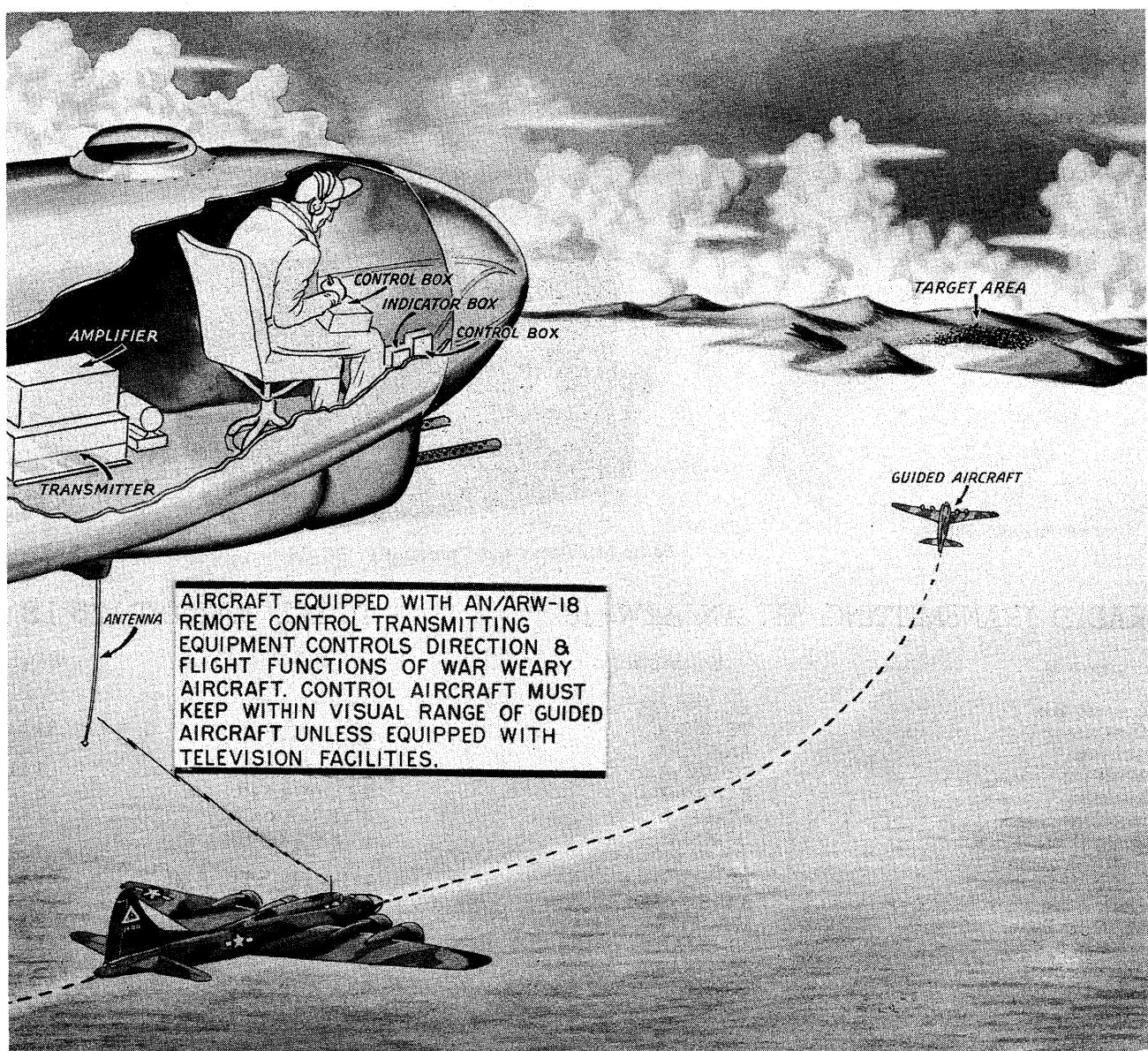
Used in conjunction with Radio Receiving Equipment AN/ARW-1, 1A, or 1B, remote control may be effected from ground to air, or air to air, up to 18 miles (normal range). The effective control range may be extended to 75 miles by use of RF amplifier unit AM-33/ART which increases the transmitted power by amplifying the output of the transmitter (AN/ARW-18). Target Control Transmitting Equipment RC-65 is similar to this equipment in construction and operation, however, tactical application is entirely different. Radio Modulator and Transmitter BC-925 may be pre-set to operate at any point within the frequency band between 30 Mc and 40 Mc.

Operation of the aircraft may be controlled through the manual operation of the controls on Control Box BC-756. This will result in transmission of certain tones to the plane for each of the (ten) movements or functions that may be desired ("up", "down", etc.). One Control Box (BC-756) is supplied for each of the two operators

required to properly control the operation of this type aircraft.

POWER INPUT	240 w, 28 v, d-c
POWER OUTPUT	20 w, without amplifier 100 w, with amplifier
FREQUENCY	30 - 40 Mc
TYPE OF SIGNAL	F-M
RANGE	18 miles (normal) without amplifier 75 miles with amplifier
OPERATORS	Two

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	12SL7GT	2	12A6
4	12SJ7	1	1625
8	12SN7GT	2	4E27
2	12SA7	2	836



Radio Transmitting Equipment AN/ARW-18 is installed in aircraft for the purpose of guiding power driven bombs during their free flight to a target.

AN/ARW-18

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RADIO TRANSMITTING SET AN/ARW-18

TOTAL WEIGHT 125 LB

Component	Nomenclature	Size	Weight
Control Box	BC-756-A (2 each)	6" x 6" x 8"	5 Lb
Dynamotor Unit	PE-180-A	10" x 6" x 8"	14 Lb.
Antenna	AN-117-A	6"	2 Lb
Mounting	FT-462-A	2" x 6" x 18"	3 Lb
Mounting	FT-442-A	2" x 6" x 18"	3 Lb
Mounting	FT-443-A	6" x 11" x 1"	1 Lb
Radio Control Box	BC-494	4" x 4" x 3"	1 Lb
Radio Modulator and Transmitter	BC-925	21" x 16" x 9"	39 Lb
Radio Frequency Amplifier	AM-33/ART	8" x 11" x 21"	39 Lb
Mounting Base	MT-171/U	2" x 11" x 22"	3 Lb
Antenna System	AS-89/ART		
Antenna Base	AB-29/ART		
Indicator	BC-727	3" x 2" x 2"	*
Lamp	LM-49		*

* Less than 1 lb.

AN/ARW-18 also includes clip, plugs, adapters, cable adapters, insulations, sockets, cordage, jack, receptacle, binding posts, fibre shoulder bushing and radio frequency cable.

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AN/ARW-26

Target Control Receiving Equipment AN/ARW-26 consists of a radio receiver and auxiliary equipment designed for installation in target aircraft to control the elementary movements of the target aircraft for gunnery practice. It operates in conjunction with Target Control Transmitting Equipment RC-56-().

The operating frequency of the receiver may be at any one of four predetermined points between the limits of 67 to 74 Mc. The frequency used depends on the number of similar systems in operation at one location.

Manual operation of the "control stick" at the transmitting station (RC-56) will result in the transmission to the target plane of different tones for each of the (five) control movements or functions desired, ("up", "down", etc.). Receiver Selector R-116/ARW-26 includes a five channel audio filter selector circuit for discrimination between the various tones received and a complex relay circuit for passing resulting control voltages to the control surfaces mechanism of the plane. Battery Box CY-237/ARW-26 supplies all the power required for 1 1/2 hours of continuous operation.

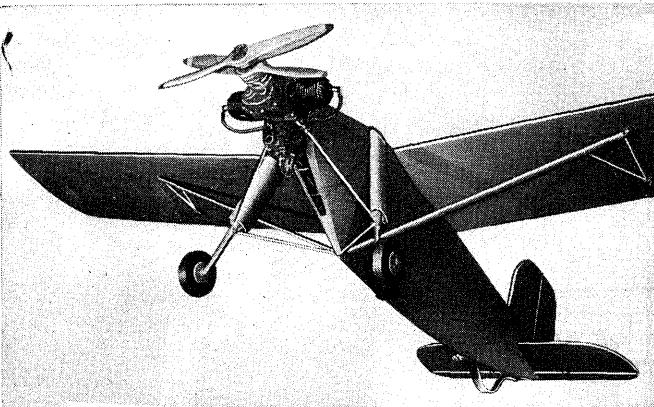
Although this target control receiving equipment can be controlled from a distance beyond normal vision, the equipment is intended only for use in the normal visual range of the control operator.

Target Control Receiving Equipment AN/ARW-26 is functionally similar to RC-57-() but due to the waterproofing of the former the components are not interchangeable as units. AN/ARW-26 is replacing RC-57-().

AN/ARW-26X is similar to AN/ARW-26 except that it contains a built-in high voltage vibrator power pack that operates from the 6 volt battery used to power the target get plane.

Test Set TS-257()/ARW is used to maintain these equipments.

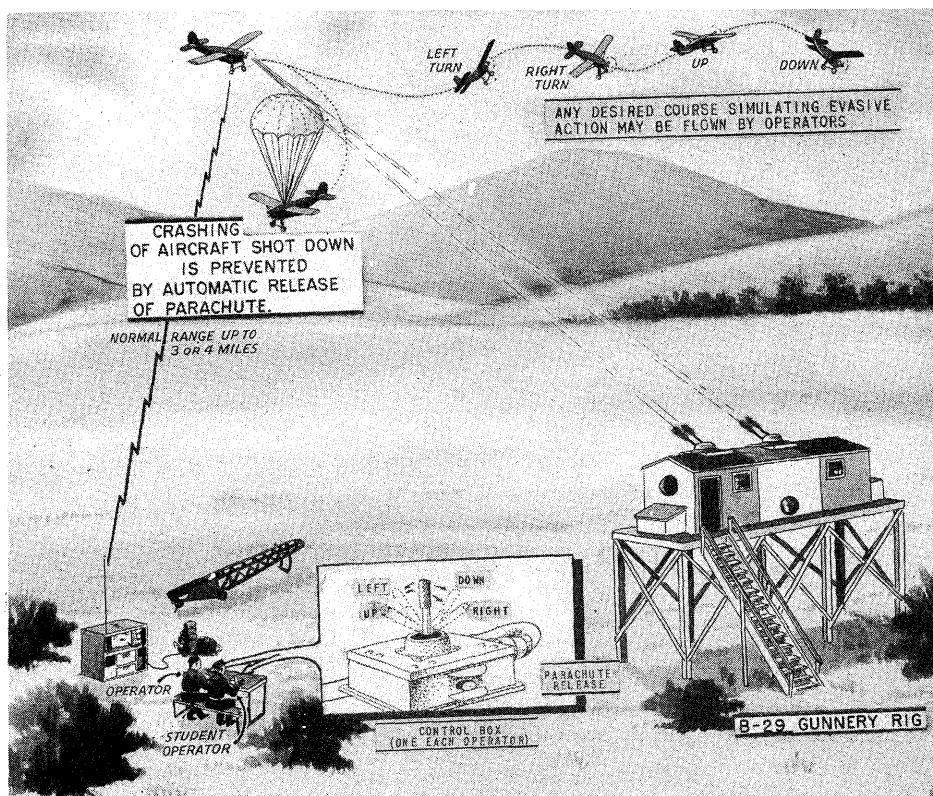
Army Air Forces Technical Order AN 08 - 16ARW26-2 is the HMI for this system.



Target Aircraft OQ-2A- One of the series of target aircraft remotely controlled by this equipment.

POWER INPUT AN/ARW-26	(2) 6 v and (3) 67 1/2 v batteries
AN/ARW-26X	18 w, 6 v, d-c (From plane)
FREQUENCY	64 - 74 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	10 miles maximum 3 - 4 miles normal
RECEIVER SENSITIVITY	200 microvolts

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
7	3Q4	1	9003
1	9002		



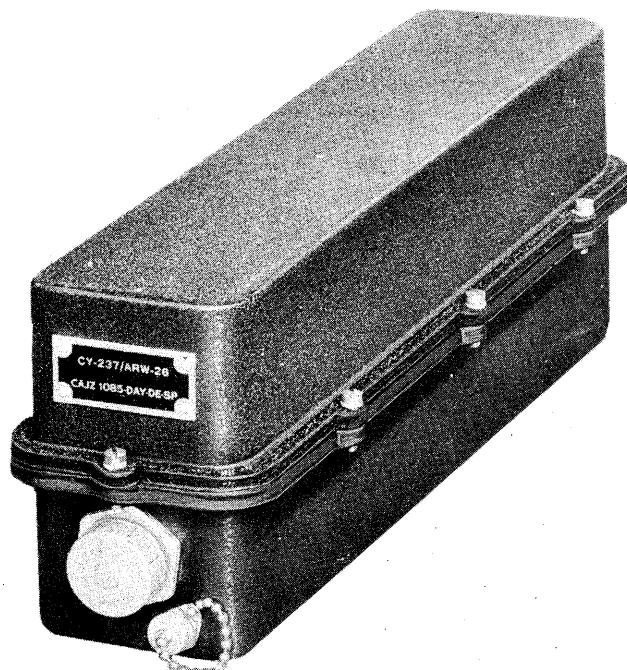
Radio Receiving Set AN/ARW-26 is a waterproof, dust proof and humidity proof target control receiving equipment designed to control ground vehicles, airborne and waterborne target craft.

AN/ARW-26

UNCLASSIFIED



Radio Receiver Selector
R-116/ARW-26



Battery Box CY-237/ARW-26



Antenna Assembly
AS-234/ARW-26

TARGET CONTROL RECEIVING EQUIPMENT AN/ARW-26

Component	Nomenclature	TOTAL WEIGHT 10 LB	
		Size	Weight
Battery Box	CY-237/ARW-26	4" x 5" x 13"	5 Lb
Radio Receiver and Selector or Radio Receiver and Selector	R-116/ARW-26	7" x 8" x 9"	4 Lb
Mounting	R-143/ARW-26X	7" x 8" x 9"	4 Lb
Tuning Unit	FT-441 (2 each)	1" x 5" x 6"	
Antenna Assemblies	TU-55		
	AS-234/ARW-26	13" long 2" dia	

AN/ARW-26 also includes package of maintenance parts, plugs, coupling nuts, etc.

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April 1946

UNCLASSIFIED

Radio Transmitting Set AN/ARW-33() is part of a system designed for the remote control of watercraft used as offensive missiles. Used in conjunction with Radio Receiving Set AN/SRW-2, air-to-water control of the Type A-3 Target Boat or that of Type A-5 Air Rescue Boat at ranges up to 60 miles may be effected. The use of televising and beacon equipment (installed in the craft) facilitates the tracking and control of the watercraft.

AN/ARW-33() is similar to Radio Transmitting Equipment RC-186, except for an additional control box (C-221(XA-1)) which increases the number of useable control functions from six to twenty-one. Transmitter Modulator BC-1158 is crystal-controlled and may be preset to any one of 50 channels between the frequency range of 53 to 95 Mc. The modulator portion of this unit contains six different audio oscillator channels, which may be used to tone modulate the transmitter carrier frequency to effect transmission and identification of the control functions desired. As a security precaution the carrier radiates only during the time that a control (tone) signal is applied to the transmitter by the modulator unit.

Control of the basic operations ("right", "left", "fast", "slow", etc.) of the craft may be effected through manipulation of Control Box BC-1156 which results in transmission of a certain tone for each of the control movements or functions that may be desired. Control of the auxiliary equipment (television (SCR-550), beacon (AN/APN-7), sonic, windshield wipers, arming device, detonating circuits, etc.)

operation may be effected through manipulation of Control Box C-211(XA-1) which results in transmission of certain dual tone combinations for each of the control movements or functions that may be desired. Reception of these tone modulated signals at the craft results in application of actuating voltages to the proper control mechanisms after discrimination by the audio-filter-selective circuit.

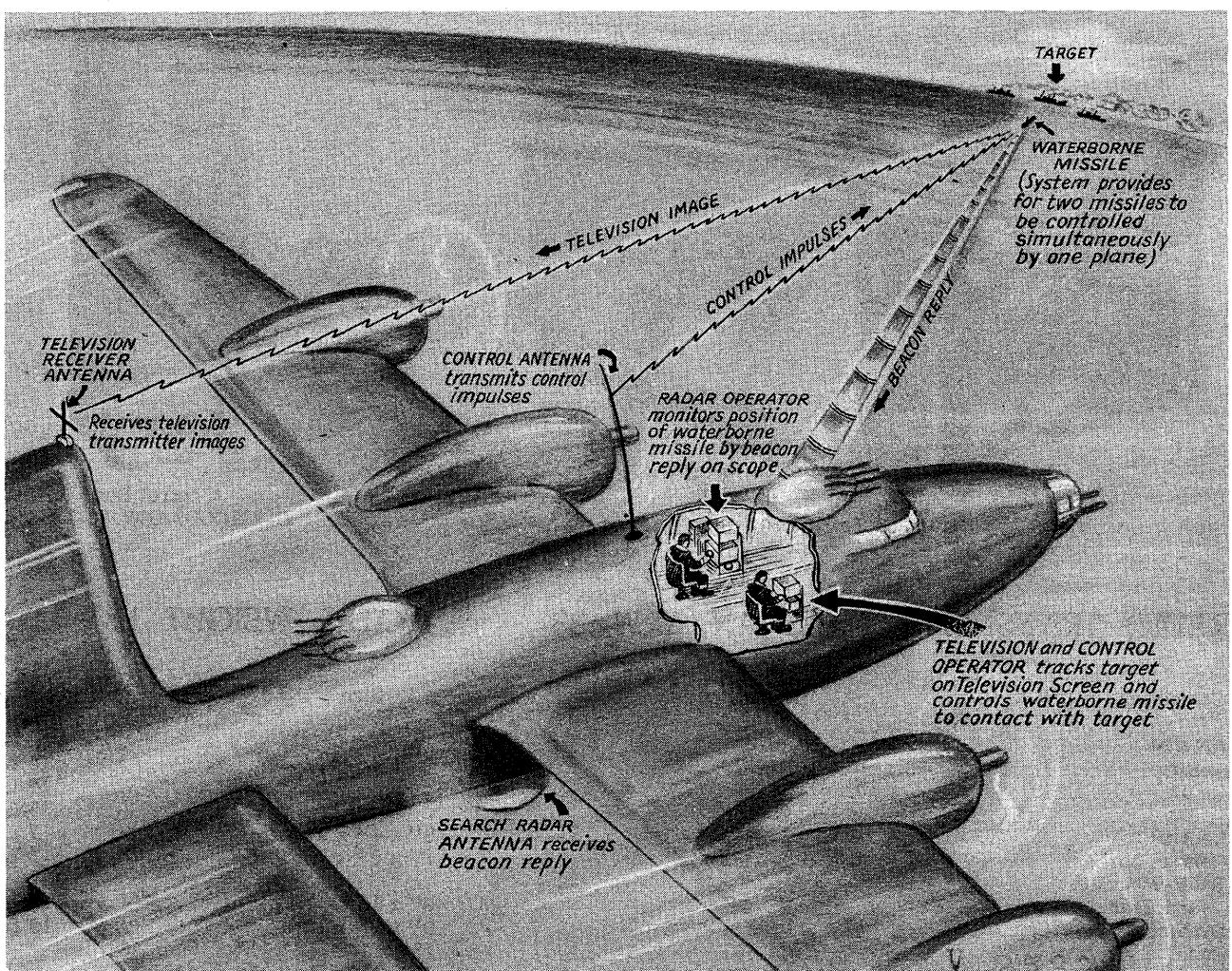
Two AN/ARW-33 equipments are supplied for each control aircraft in order that two missiles may be controlled from a single airplane.

Test Set TS-327/VRW is for checking the operation of AN/ARW-33.

Only a small quantity of Radio Transmitting Set AN/ARW-33 were produced.

POWER INPUT	340 w, 24-28 v, d-c
POWER OUTPUT	23-25 w
FREQUENCY	53 - 95 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	60 miles (normal)
OPERATORS	Two (one per equipment)

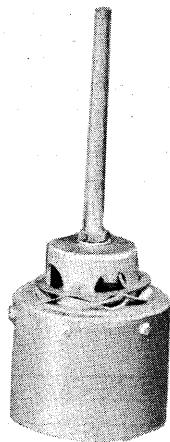
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
4	815	10	12SN7GT



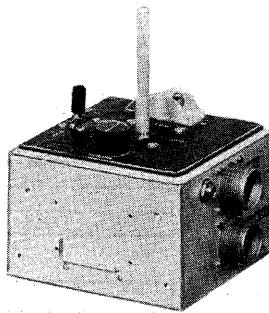
Radio Transmitting Set AN/ARW-33 is part of a system designed for the remote control of waterborne missiles used in conjunction with Radar Search and Television equipments permits an effective offensive range up to 60 miles even in overcast conditions.

UNCLASSIFIED

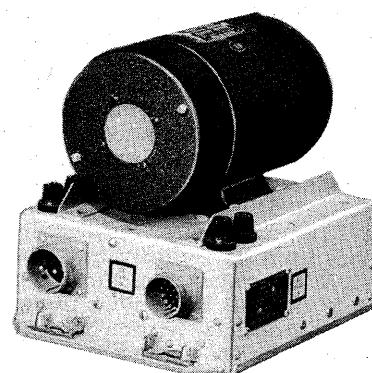
AN/ARW-33()



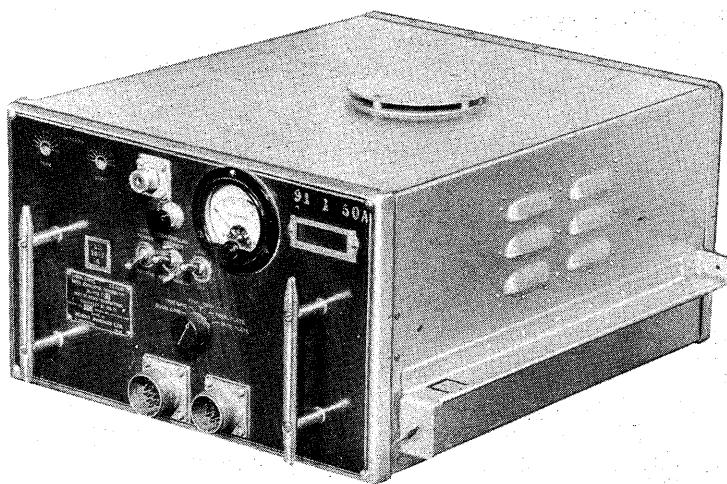
Antenna Assembly
AS-150/ART



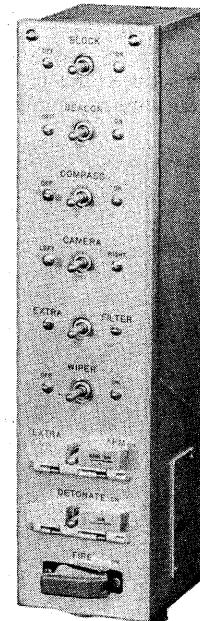
Control Box BC-1156



Dynamotor Unit PE-186-TIX



Radio Modulator and Transmitter BC-1158-TIX



Control Box
C-221(XA)/ARW-33(XA-1)

RADIO TRANSMITTING SET AN/ARW-33

TOTAL WEIGHT 135 LB

Component	Nomenclature	Size	Weight
Antenna	AS-89		15 Lb
or	AS-97		15 Lb
or	AS-150		15 Lb
or	AS-161		15 Lb
Control box	C-221(XA-1)	3" x 4" x 17"	7 Lb
Control box	BC-1156	7" x 6" x 5"	3 Lb.
Radio Modulator and Transmitter	BC-1158	9" x 16" x 17"	32 Lb
Dynamotor Unit	PE-186-TIX	8" x 7" x 10"	18 Lb.
Case	CS-151	16" x 16" x 2"	
Mounting	FT-499	4" x 14" x 16"	
Mounting	FT-497		

AN/ARW-33 also includes plugs, cables, hardware, etc.

Radio Transmitting Set AN/ARW-38() is the transmitting equipment of a system designed for remote control of free falling bombs. When used in conjunction with Radio Receiving Set AN/CRW-7 it will provide "Razon" (range and azimuth) control of the VB-3 free falling bomb or "Azon" (azimuth only) control of the VB-1 or VB-2 free falling bombs. Used in conjunction with Radio-Receiving Set AN/CRW-2 it will provide "Azon" control of the VB-1 or VB-2 free falling bombs.

High intensity flares, attached to tail of the bomb, extend the normal visual tracking range. AN/ARW-38 contains all of the major components of Radio Transmitting Equipment RC-186 plus an additional control box (BC-1156-A), and two relay units (RE-52/ARW-38) which increase the utility of this equipment for this type application. The two control boxes (BC-1156-A), are provided with AN/ARW-38 for control of VB-3 free falling bombs. One may be used by the bombardier, with the aid of the bombsight, to control flight of the missile in range (up or down), and the other by a second operator (usually located in the rear of the plane) to control flight of the missile in azimuth (right or left).

Relay Unit RE-52/ARW-38 controls a circuit which supplies correcting voltages to the bombsight in order to compensate for the delay in descent of the bomb as a result of the controlling action. In addition actuating voltages are supplied to special light circuits within the camera equipment (recording the bomb's descent) to provide a permanent record of the control of the missile during flight.

Radio Modulator and crystal-controlled Transmitter BC-1158 may be set to any one of fifty-seven (57) pre-determined frequencies within range of 53 to 95 Mc. The modulator portion contains six different audio oscillator channels, any one of which, or one of four two tone combinations may be used to tone-modulate the transmitter carrier frequency.

Remote control of missile may be effected within visual range by manipulation of the two control boxes (BC-1156-A) which results in the tone modulation of the carrier and transmission of certain tones for each control movement or function that may be desired ("right", "left",

"up", "down", "right-up", "left-up", "right-down", "left-down"). Reception of these tones at the missile results in application of actuating voltages to the proper flight control mechanisms after discrimination by the audio-filter selective circuit. "Razon" operation requires the use of only four tone channels. "Azon" operation requires the use of only two tone channels.

Test Equipment for maintenance of this system consists of the following items:

CLASS A

(For testing at the airplane)

TS-297/U

Multimeter

CLASS B

(For Testing at a fixed or mobile shop)

TS-297/U

Multimeter

TS-118/AP

RF Wattmeter

TS-174/U

Frequency Meter

TS-289/UP

Oscilloscope

TS-382/U

Audio Oscillator

TS-375/U

Voltmeter

TS-414/U

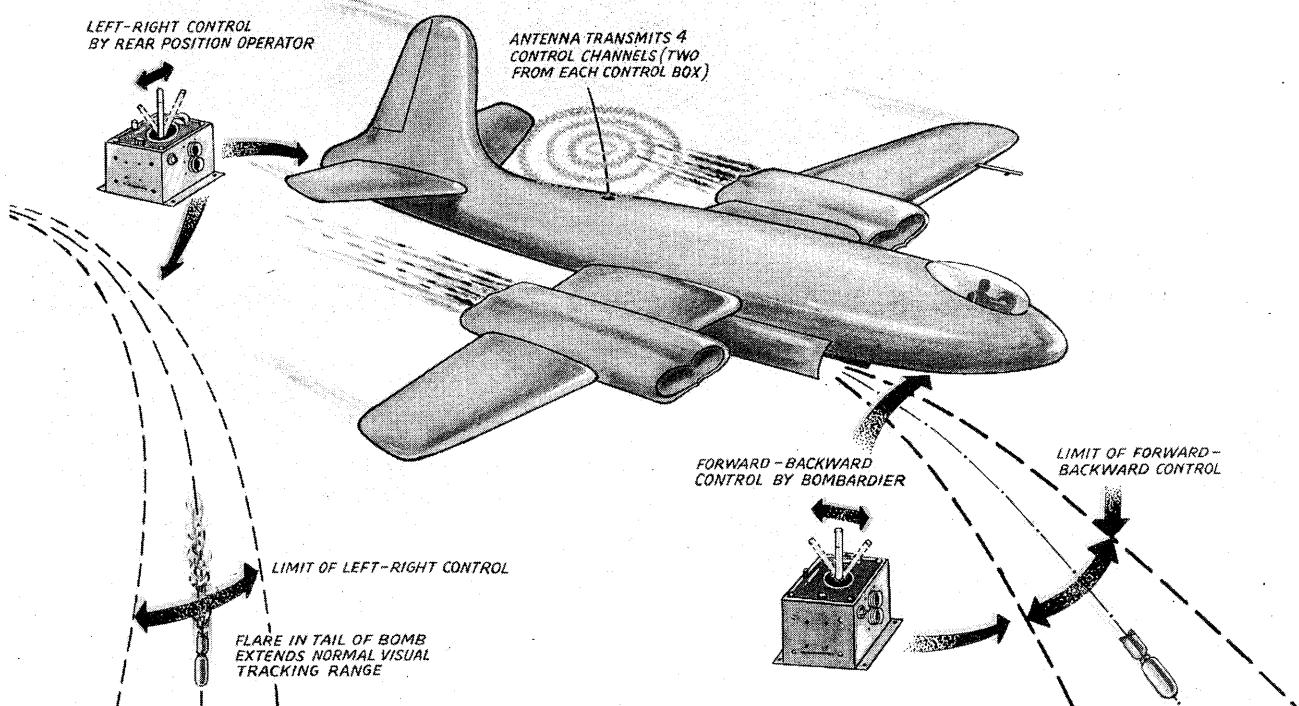
Dynamotor Test Set

I-177

Tube Tester

POWER INPUT	350 w, 24 - 28 v, d-c
POWER OUTPUT	12 w
FREQUENCY	53 to 95 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	Maximum visual range
OPERATORS	Two (when controlling VB-3)

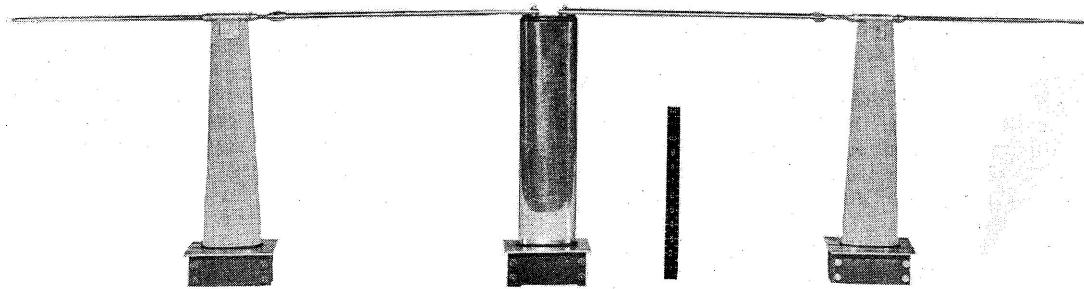
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
4	815	10	12SN7GT



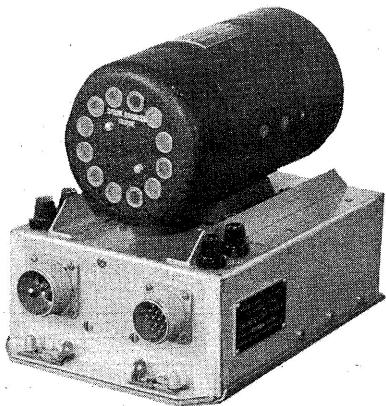
Radio Transmitting Set AN/ARW-38 installed in attack & bomber aircraft for remote control of free falling bombs to select targets.

AN/ARW-38()

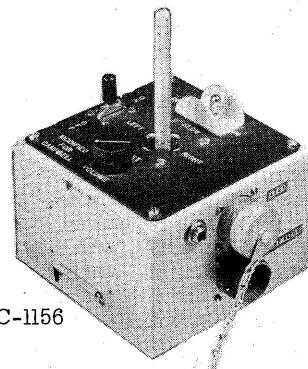
~~RECEIVER~~



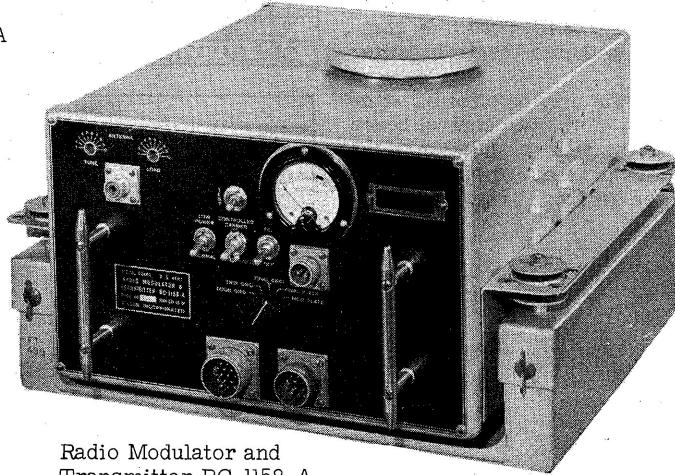
Antenna Assembly AS-254/ARW-38



Dynamotor Unit PE-186-A



Control Box BC-1156



Radio Modulator and Transmitter BC-1158-A

RADIO TRANSMITTING SET AN/ARW-38()

TOTAL WEIGHT 50 LB

Component	Nomenclature	Size	Weight
Radio Modulator and Transmitter	BC-1158	9" x 16" x 17"	32 Lb
Control Box (2 ea)	BC-1156-A	7" x 5" x 5"	6 Lb
Relay Unit (2 ea)	RE-52/ARW-38	2" x 5" x 5" (two)	2 Lb
Antenna	AS-254/ARW-38		
Tuning Unit	TU-75-()		
Dynamotor Unit	PE-186-()		
Mounting	FT-499	4" x 14" x 16"	*
Mounting	FT-497	6" x 7" x 1/2"	*
Case	CS-151	12" x 12" x 2"	6 Lb

AN/ARW-38 also includes plugs, cables, etc.

* Less than 1 lb.

Section 5 - Graphic Survey

April 1946

UNCLASSIFIED

AN/AXR-1

Radio Receiving Set AN/AXR-1 is a television receiving and reproducing system for use in aircraft controlling the flight of a guided missile. Scenes viewed by Radio Transmitting Set AN/AXT-2 (television transmitting equipment in war weary aircraft or a GB-4 guided glide bomb) may be reproduced at the control aircraft utilizing Radio Receiving Set AN/AXR-1.

The major components of AN/AXR-1 are: Radio Receiver R-68/AXR-1, Monitor Indicator Unit ID-66/AXR-1 and ten different (frequency) receiving antennas.

Radio Receiver AN/AXR-1 is a superheterodyne type receiver which amplifies the received signal, removes the video component from the carrier, impresses this video signal on the grid of the picture reproducer tube which then reproduces the scene viewed by the AN/AXT-2 camera equipment. This unit also houses and generates the necessary horizontal and vertical deflection voltages for the picture reproducer (cathode-ray) tube. The scanning of the picture pickup mosaic screen (AN/AXT-2) and the generating of sweep circuits for the picture reproducer tube (AN/AXR-1) are synchronized by special pulses generated by the AN/AXT-2 transmitter.

The Monitor Indicator Unit ID-66/AXR-1 provides an auxiliary presentation of the scene viewed at some other point in the aircraft as may be tactically required. In addition, it may be used as a piece of test equipment to adjust or service Radio Transmitting Set AN/AXT-2.

Ten different receiving antenna units are supplied with one AN/AXR-1 equipment. They operate at spot frequencies (located approximately 12 Mc apart) between the frequency band of 264 to 372 Mc. The antenna is normally gyro stabilized within the aircraft.

AN/AXR-1 is similar to Radio Set SCR-550-B and Navy Type ARK Equipment.

The test equipment required for servicing this

unit consists of:

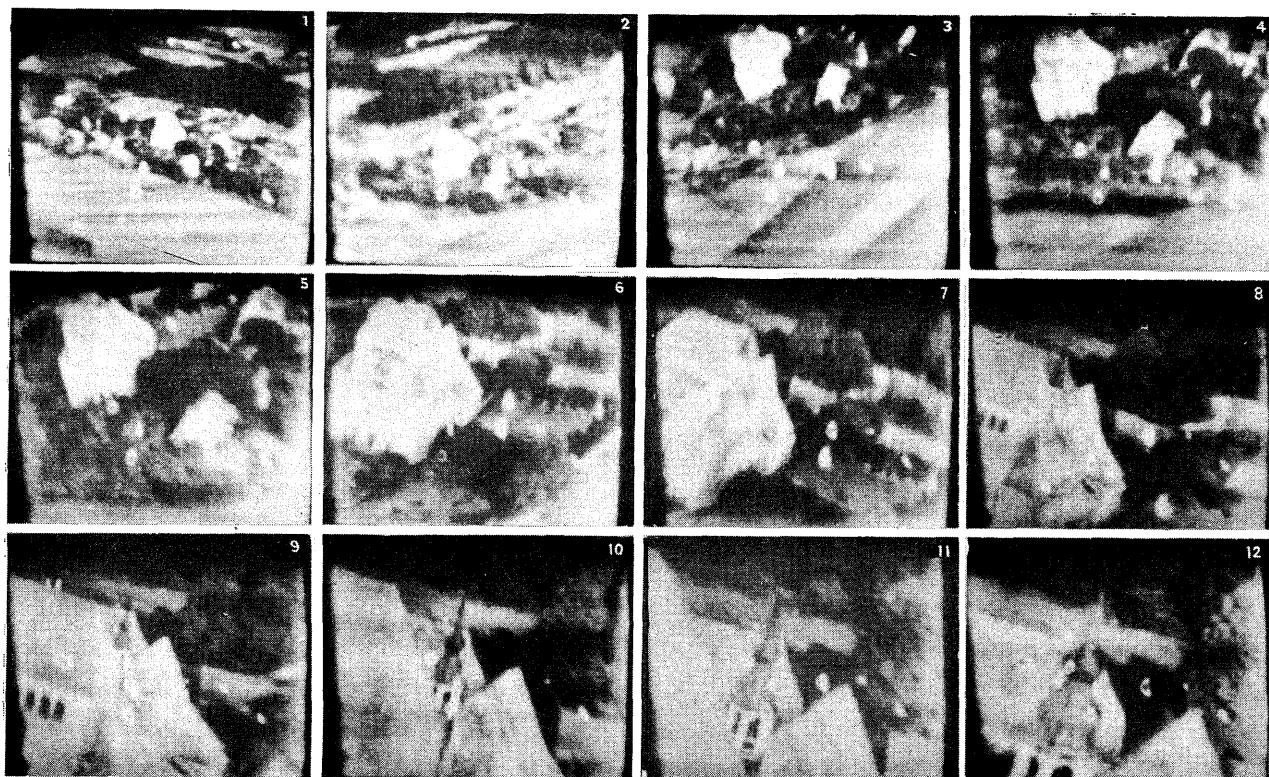
Class A, TS-175/U Frequency Meter, I-206-A Test Set, TS-297/U Multimeter.

Class B, I-231 Alignment Test Set, RCA-MI-18709 Sweep Frequency Generator, RCA MI-18725 Horizontal Deflection Voltage Supply, RCA MI-18726 Diode Detector, LAF Signal Generator, TS-239/UP Oscilloscope, TS-382/U Audio Oscillator, TS-375/U Voltmeter, I-177 Tube Tester, TS-414/U Dynamotor Test Set, TS-352/U Multimeter. Also all of Class A Items.

CO-AN 08-30AXR-1-2-M is the HMI for AN/AXR-1.

POWER INPUT	286 w, 28.6 v,d-c(Television)
	79 w, 28.6 v,d-c(Monitor)
FREQUENCY	264 - 372 Mc
TYPE OF SIGNAL	Television AM
RANGE	75 Miles (maximum)
SENSITIVITY FOR	
GOOD REPRODUCTION	50 Microvolts
VIDEO BAND PASS	40 cps - 4.5 Mc
REPRODUCED	
PICTURE SIZE	3 1/2" x 4 7/8" (7" tube)

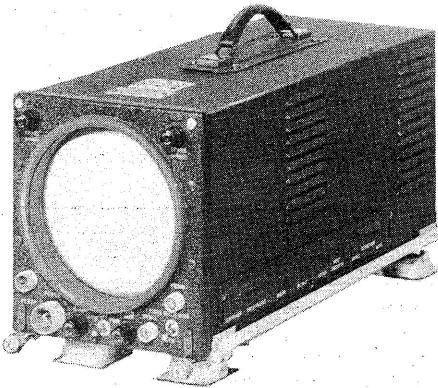
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
.2	6J6	2	807
6	6AG5	3	6SN7GT
2	OC3/VR105	2	8016
9	12SN7GT	2	7CP1
1	6H6	1	6J4
2	6AC7	1	6AG7
1	6SL7GT		



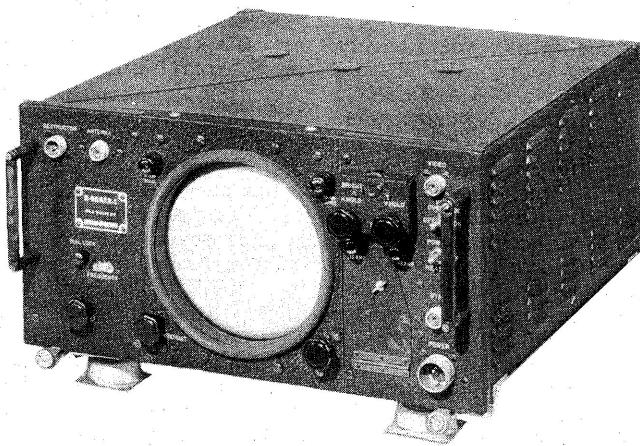
Shown above is a sequence of photographs taken from 16 mm Film Recording of Television Screen during flight of a GB-4 Glide Bomb over France Sept. 1944.

AN/AXR-1

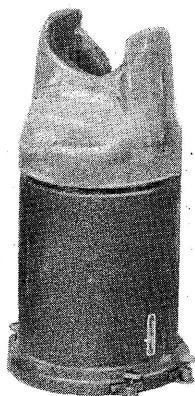
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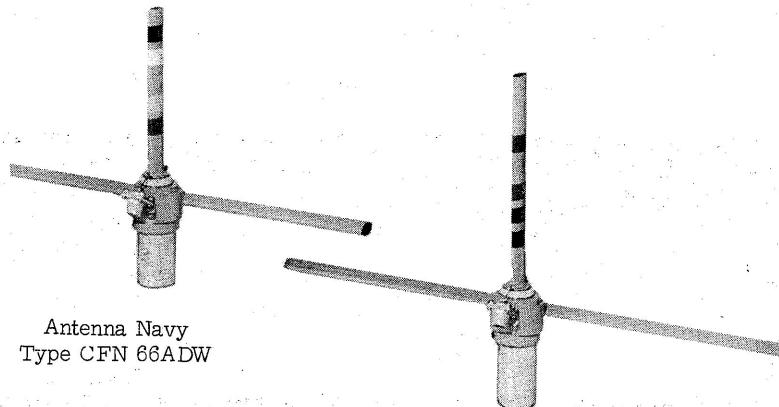
Monitor Indicator ID-66/AXR-1



Radio Receiver R-68/AXR-1



Light Shield (two required)



Antenna Navy
Type CFN 66ADW

Antenna Navy
Type CFN-66AFW

RADIO RECEIVING SET AN/AXR-1

TOTAL WEIGHT 110 LB

Component	Nomenclature	Size	Weight
Receiver	R-68/AXR-1	18" x 23" x 10"	54 Lb
Monitor Indicator Unit	ID-66/AXR-1	9" x 20" x 11"	30 Lb
*Antenna (five lower channels)	CFN-66AFW	21" wide x 12" high	2 Lb
*Antenna (five upper channels)	CFN-66ADW	17" wide x 10" high	2 Lb
Receiver Mounting Base	FT-255-A	18" wide 21" deep	3 Lb
Monitor Indicator Mounting Base	FT-456-A	9" wide 20" deep	1 Lb
Antenna (10)	AN-171 thru AN-180		1 Lb ea

AN/AXR-1 also includes cables, light shields, plugs, etc.

*Supplied but normally not used.

UNCLASSIFIED

AN/AXT-2

Radio Transmitting Set AN/AXT-2 is a complete television pickup and transmitting system used with Radio Receiving Set AN/AXR-1 (television receiver) to reproduce remote scenes. This equipment is designed for use and installation in guided missiles (GB-4 Glide Bomb or B-8 War Weary) to transmit complete flight pictures to the missile controller.

The major components of AN/AXT-2 are: Conversion Unit PH-522/AXT-2, Radio Transmitter T-61/AXT-2, Filter Junction Box J-60/AXT-2, Dynamotor DM-25, and one of ten available antennas.

Conversion Unit PH-522/AXT-2 contains an infinity-focus optical system and television camera pick-up tube, plus the necessary sweep and electrical circuits for transforming the light waves from the viewed scene into equivalent video signals which modulate the transmitter. The conversion unit generates signals which synchronize the scanning of the mosaic screen with the sweeps of the reproducer tube at the receiver (AN/AXR-1). Radio Receiver AN/CRW-7 (in the missile) actuates the relay mechanism which operates the camera lens stop and optical filter (to prevent "burning" the mosaic) and the optical heating system (to prevent fogging). Radio Transmitting Set RC-186 (in the control plane) is the (companion) camera control transmitting station.

Radio Transmitter T-61/AXT-2 may be adjusted to operate on any one of the ten different frequency channels between 264 to 372 Mc, thus permitting the simultaneous operation of ten separate sets within the same general area without interference. A different antenna unit is required for each of the ten operating frequencies. Only one antenna is furnished with a complete AN/AXT-2 system.

Radio Transmitting Set AN/AXT-2C was the forerunner of AN/AXT-2 and consisted of the Navy Type ATK equipment as modified by the Maintenance Division of AMC. In Radio Transmitting Set AN/AXT-2C, the camera equipment was housed in a special case (CY-390) and a repeat-back compass was mounted optically so that it projected a portion of the compass heading (indicating direction of travel) on the screen of the reproducer tube. Radio Control Receiving Set AN/ARW-1 (war weary aircraft) was used for remote control of the lens and filter system while Radio Transmitting Set AN/ARW-18 (in the control plane)

was the remote control transmitting station (television equipment). Radio Transmitting Set AN/AXT-2 is similar to the Navy Type ATK equipment and Radio Set SCR-549-AM.

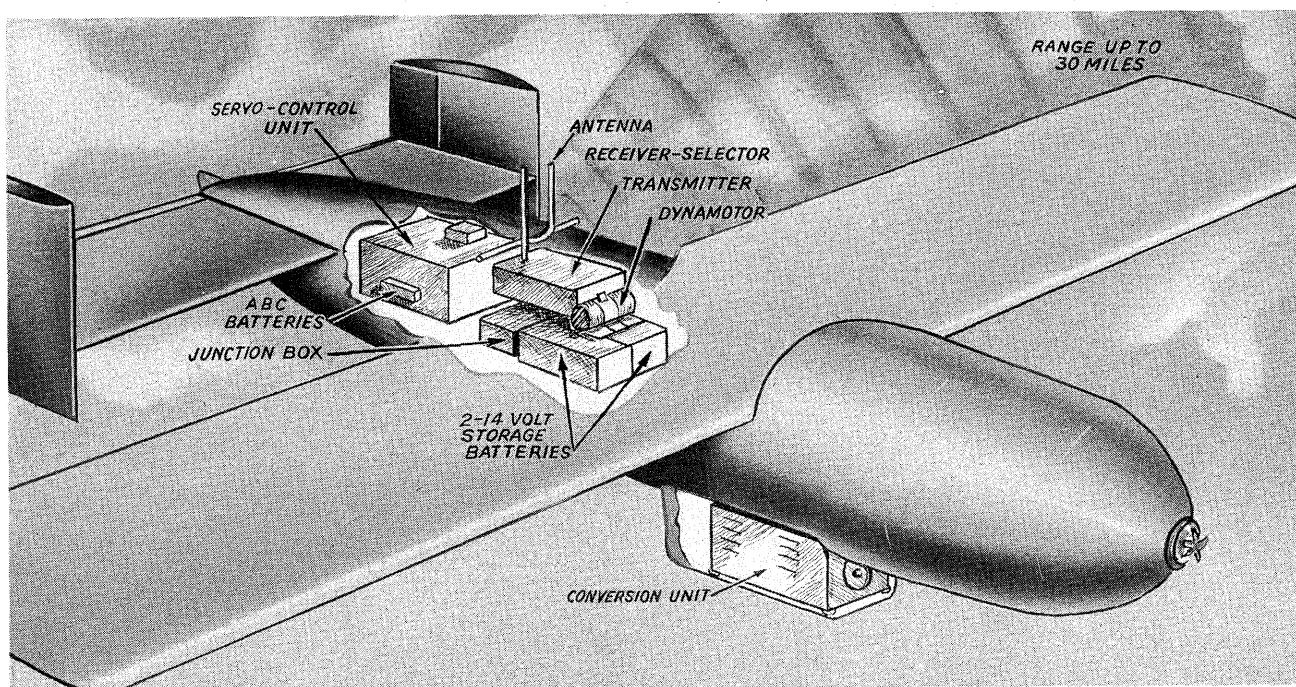
Radio Set AN/AXT-3 is similar to this equipment except that it contains an additional optical system and conversion unit for televising flight panel data. This system was never procured as such but constituted a modification of AN/AXT-2.

The test equipment for AN/AXT-2 consists of the following: Class A - ID-66/AXR-1 Monitor Indicator (BC-1214-A Monitor Unit), I-206-A Test Unit, TS-297/U Multimeter, TS-175/U Frequency Meter, Class B - TS-382/U Audio Oscillator, I-231 Alignment Test Set, I-232 Fluorescent Projector, I-237 Field Strength Indicator, I-177 Tube Tester, TS-239/UP Oscilloscope, TS-375/U Voltmeter, TS-414/U Dynamotor Test Set, TS-352/U Multimeter. Also includes Class A items listed above.

CO-AN-08-30AXT2-2M is the HMI for AN/AXT-2.

POWER INPUT (BATTERIES)	730 w, 26.5 v, d-c (operating life 35 minutes)
POWER OUTPUT	15 w
FREQUENCY	264 - 372 Mc
RANGE	30 miles maximum
VIDEO BAND PASS	40 cps to 4.5 Mc
OVERALL RESOLUTION	325 lines horizontal 300 lines vertical
FRAME FREQUENCY	40 cps
MAXIMUM FIELD VIEW	20° (horizontal)
TYPE OF SIGNAL	Television AM

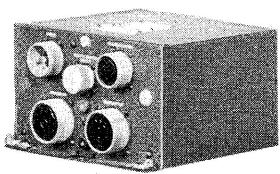
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	RCA 1846	4	8025
4	RCA 1649	1	955
4	12SN7GT	2	6SH7
2	12SL7GT	1	6SL7
2	6X5GT	1	6Y6GT
2	OD3/VR-150	1	5Y3GT
4	6L6		



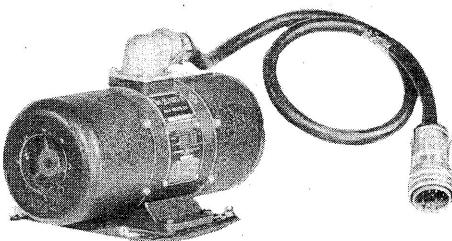
Radio Transmitting Set AN/AXT-2 is a compact television transmitting equipment used to transmit visual information from a guided missile regarding its relative position and approach to a target.

AN/AXT-2

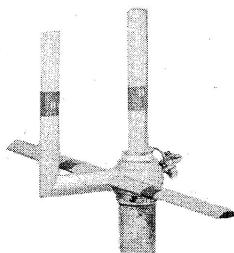
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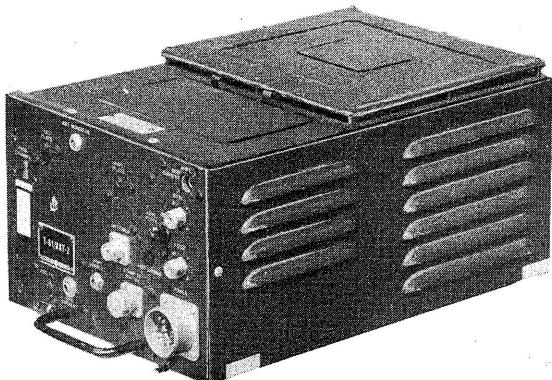
Filter Junction Box
J-60/AXT-2



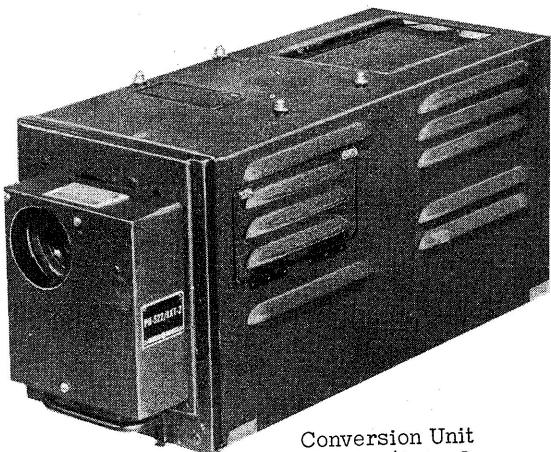
Dynamotor DM-25



Antenna AN-178



Radio Transmitter
T-61/AXT-2



Conversion Unit
PH-522/AXT-2

RADIO TRANSMITTING SET AN/AXT-2

TOTAL WEIGHT 110 LB

Component	Nomenclature	Size	Weight
Conversion Unit	PH-522/AXT-2	9" x 24" x 12"	39 Lb
Radio Transmitter	T-61/AXT-2	12" x 18" x 10"	26 Lb
Filter Junction Box	J-60/AXT-2	9" x 8" x 5"	8 Lb
Dynamotor	DM-25	12" x 6" x 9"	23 Lb
Battery	BB-201/U (2 ea.)		*
Switch	SA-34/AXT-2	2" x 5" x 6"	2 lb (ea)
Antenna (10)	AN-171 thru AN-180 (1) ea	22" x 7" x 13"	3 Lb
Mounting	FT-451-A		1 Lb
Mounting	FT-452-A		2 Lb
Mounting	FT-453-A		3 Lb
Mounting	FT-454-A		
Case (AN/AXT-2)	CY-244/AXT-2		
* Less than 1 lb.			

UNCLASSIFIED

AN/CRW-2

Radio Receiving Set AN/CRW-2, part of a remote control bombing system, consists of a radio receiver and auxiliary equipment, designed for installation in high angle, free falling bombs such as the VB-1 (Azon). In conjunction with Radio Transmitting Equipment RC-186 or AN/ARW-38, this set may be used to control the movement (azimuth only) of the falling bomb up to maximum visual ranges. A high intensity flare attached to the tail of the bomb aids in observing the path of flight.

Radio Receiver R-74/CRW-2, the major component of AN/CRW-2, is a super-regenerative receiver that may be pre-set on any one of five different frequencies between 80 and 90 Mc.

Remote control of the missile may be effected from the airborne control transmitting station (RC-186) by manipulation of the control box to either one of the two control positions ("right" or "left"). This will result in transmitter carrier modulation and transmission of a certain tone for each of the control movements ("right" or "left") that may be desired. At the radio receiver (R-74/CRW-2), the received signal is fed to the two channel audio-filter-selector circuit which discriminates between the two transmitter control tones and relays actuating voltages to the proper control surface servo mechanisms.

Radio Receiving Equipment AN/CRW-2 differs from the equipments listed below as indicated:

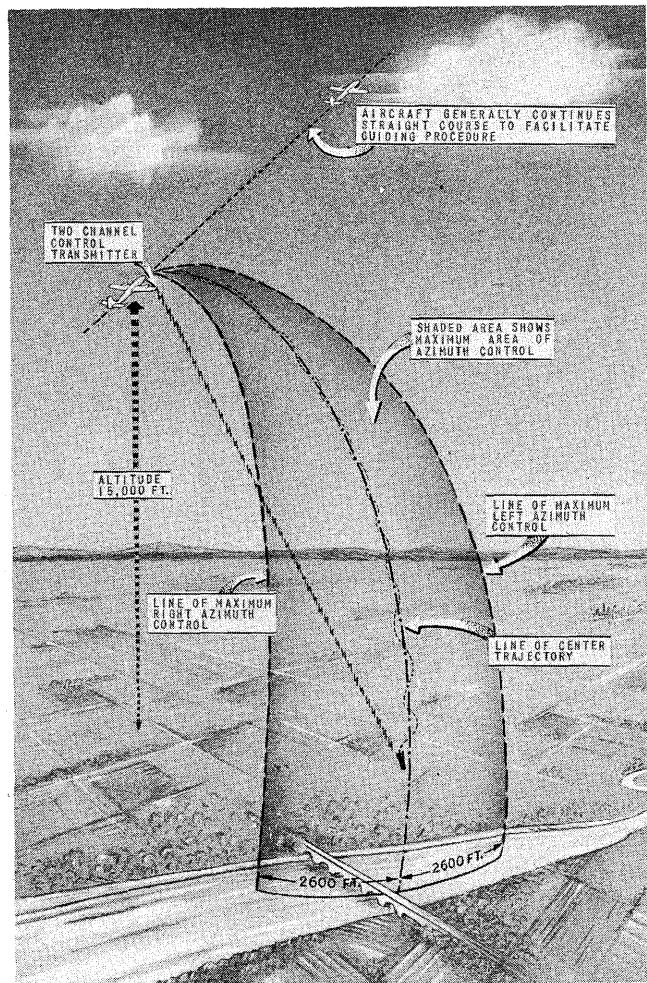
AN/CRW-2A has improved r-f plug-in units and circuit design; the parts are not interchangeable with AN/CRW-2.

AN/CRW-2B has a superheterodyne receiver, no high voltage power supply (operates directly from power source), and has one band switch for tuning through the entire frequency range of 53 to 93 Mc.

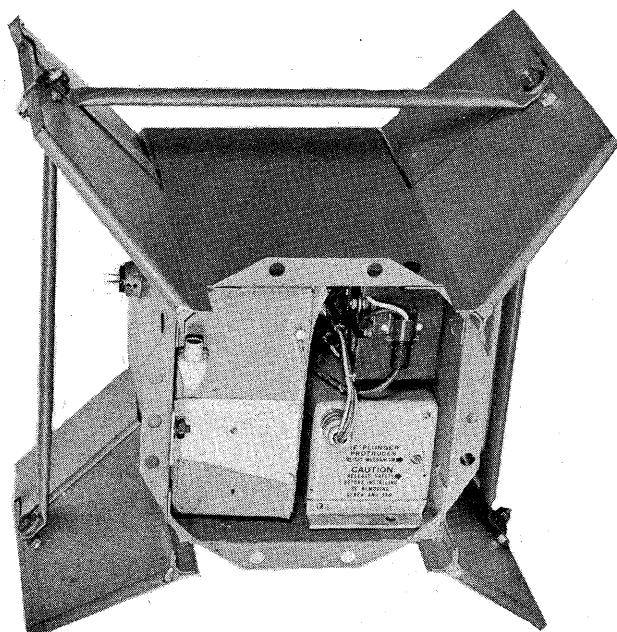
AN/CRW-2C is an improved version of AN/CRW-2B and differs from AN/CRW-2 in the same respects.

Note: • AN/CRW-2B and AN/CRW-2C were never produced in any quantity.

AN 08-30CRW2-2 is the HOI, and CO-AN 08-30CRW2-M is the HMI, for AN/CRW-2, and AN/CRW-2A.



Radio Receiving Set AN/CRW-2 installed in vertical type bombs provides for precision pin-point bombing of tactical targets.



Radio Receiving Set AN/CRW-2

Test equipment for maintenance of these units consists of the following:

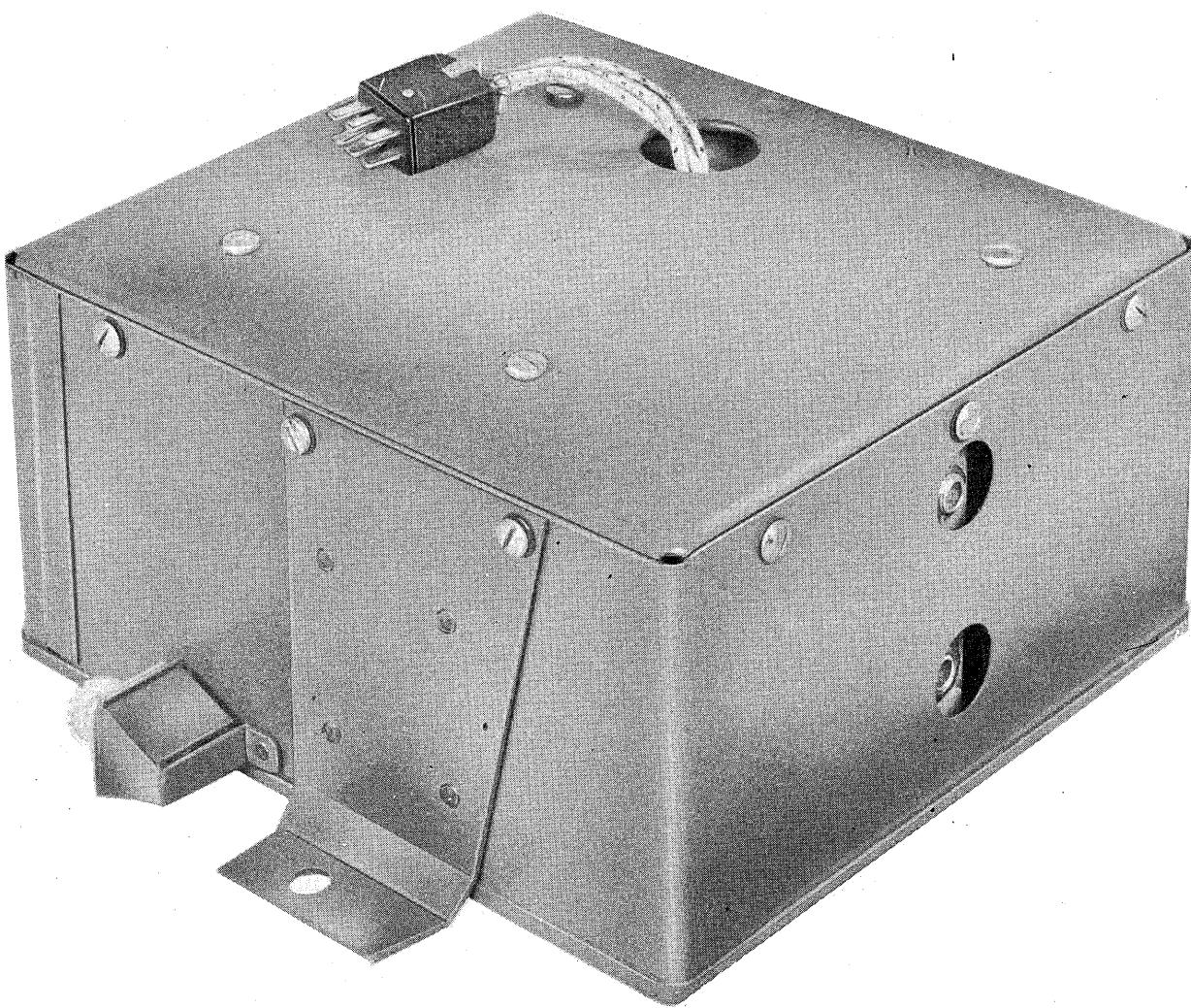
TS-154/CRW-2	Test Box	Class A Special
AN/CRW-1	Test Equipment	Class A General
AN/CRM-2	Test Equipment	Class B General

POWER INPUT	72 w, 24 v, d-c
FREQUENCY	AN/CRW-2: 80 to 90 Mc AN/CRW-2A: 53 to 93 Mc
TYPE OF SIGNAL, RANGE	Modulated C W Line of sight
SENSITIVITY	30-200 microvolts
AN/CRW-2 AN/CRW-2A	50 microvolts

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	6SN7GT	1	6J5
3	6SL7GT	1	6SG7

AN/CRW - 2

UNCLASSIFIED



Radio Receiver R-75/CRW-2A

RADIO RECEIVING SET AN/CRW-2

TOTAL WEIGHT 14 LB

Component	Nomenclature	Size	Weight
Radio Receiver	R-74/CRW-2	4" x 8" x 8"	4 Lb
Tuning Unit	TN-51/CRW-2	3" x 3" x 4"	
Tuning Unit	TN-50/CRW-2	3" x 3" x 4"	
Tuning Unit	TN-49/CRW-2	3" x 3" x 4"	
Tuning Unit	TN-48/CRW-2	3" x 3" x 4"	
Tuning Unit	TN-47/CRW-2	3" x 3" x 4"	
Tuning Unit	TN-45/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-44/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-43/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-42/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-41/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-40/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-39/CRW-2	2" x 2" x 3"	
Tuning Unit	TN-38/CRW-2	2" x 2" x 3"	

RADIO RECEIVING SET AN/CRW-2A

TOTAL WEIGHT 13 LB

Radio Receiver R-75/CRW-2A

5" x 9" x 8"

13 Lb

UNCLASSIFIED

AN/CRW-7

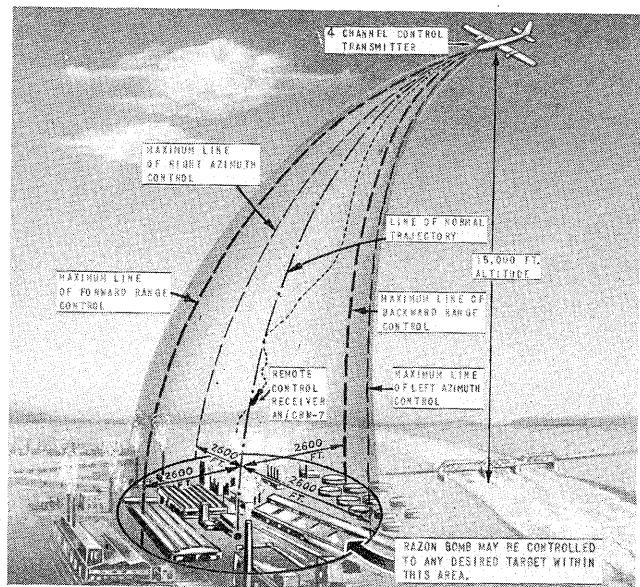
Radio Receiving Set AN/CRW-7, part of a remote control bombing system consists of a radio receiver and auxiliary equipment, designed for remote control of, and installation in high angle, free falling bombs such as the VB-3 (Razon). Used in conjunction with Radio Transmitting Set AN/ARW-38, the movement ("right-left", "up-down") of the falling bomb may be controlled up to maximum visible range. A high intensity flare attached to the tail of the bomb aids in following the path of flight.

Remote control of the missile may be effected from the airborne transmitting station (AN/ARW-38) by manipulation of the control box to either of the four control positions. This will result in transmitter carrier modulation and transmission to the missile of a certain audio tone for each of the (four) movements that may be desired ("up", "down", etc.). Radio Receiver R-150/CRW-7, a crystal controlled superheterodyne receiver that may be pre-set on any one of 47 frequencies, includes a four channel audio-filter-selector circuit and associated relays. The selector circuit discriminates between the various control tones received and passes the resulting control voltages to the proper servos that actuate the aircraft control surface mechanisms.

AN 16-30CRW-7-2 is the HOI and CO-AN 16 30CRW7-2-M is the HMI for AN/CRW-7.

The following test equipment is required for maintenance of this unit:

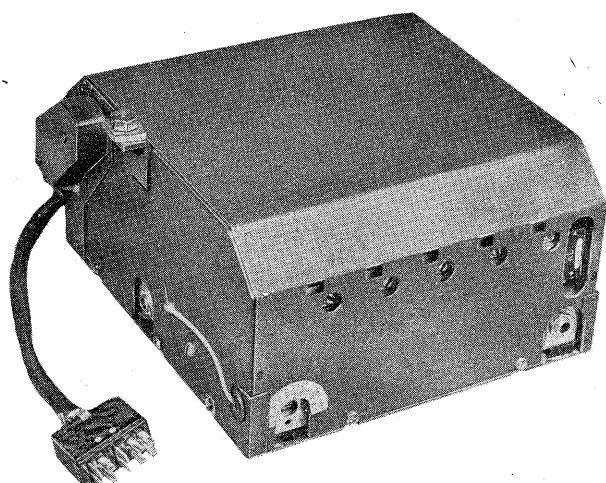
TS-326/U	Test Oscillator	Class A or B
TS-297/U	Multimeter	Class A or B
TS-239/UP	Oscilloscope	Class B
TS-375/U	Voltmeter	Class B
TS-352/U	Multimeter	Class B
TS-414/U	Dynamotor	Class B
I-177	Tube Tester	Class B



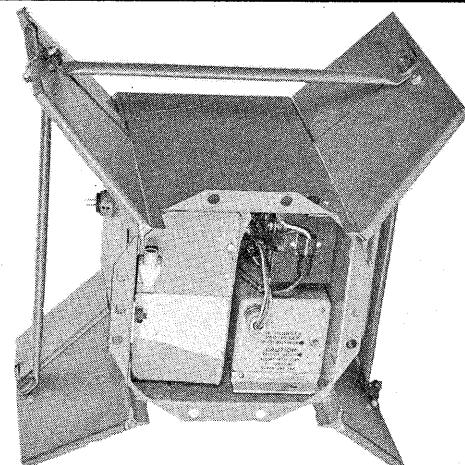
The Remote Controlled "Razon" Bomb can be controlled in both Range and Azimuth as shown above.

POWER INPUT	72 w. 24 v. lead-acid battery
FREQUENCY	65.9 - 92.3 Mc
TYPE OF SIGNAL	Modulated CW
RANGE	Line of sight
RECEIVER SENSITIVITY	50 microvolts

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
6	6AG5	1	6AL5
2	6J6		



Radio Receiver R-150-AN/CRW-7



Tail Assembly of Radio Bomb showing installation of Radio Receiving Set AN/CRW-7

RADIO RECEIVING SET AN/CRW-7

TOTAL WEIGHT 16 LB

Component	Nomenclature	Size	Weight
Radio Receiver	R-150/CRW-7	9" x 8" x 5"	16 Lb
Crystal Unit	CR-1A/AR		
Plug	Jones Type P-310-CCT		

AN/CRW-7 also includes operating and maintenance handbooks and necessary spare parts groups.

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AN/TRW-1

Target Control Transmitting Equipment AN/TRW-1 is a radio transmitter and auxiliary equipment used for the remote control of land or waterborne targets during gunnery and bombing practice. It is operated in conjunction with Target Control Receiving Equipment AN/VRW-1, the components of which are mounted within the target proper. AN/TRW-1 may be ground based or it may be mounted in a suitable Army vehicle. It consists of the major components of Target Control Transmitting Equipment RC-56-(), differing principally in the control box, mounting brackets and cabling.

The operating frequency of Radio Modulator and Transmitter BC-463-A may be set to any one of four predetermined frequencies within the band of 67 to 74 Mc.

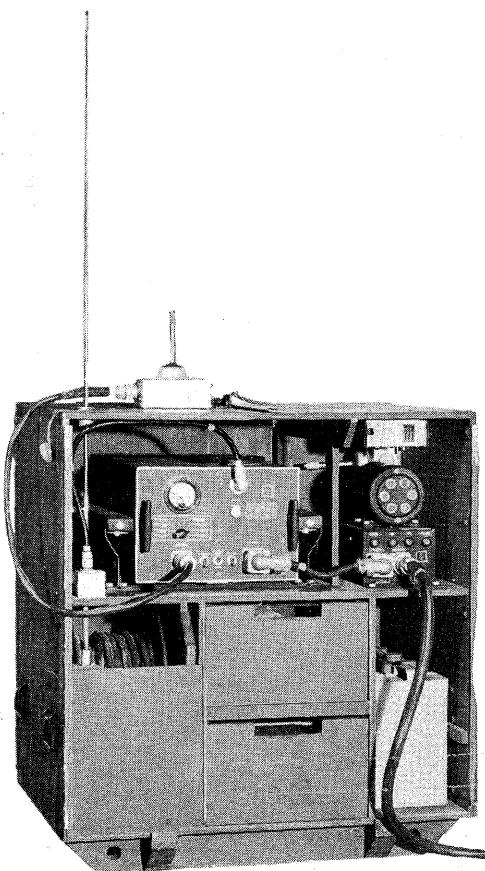
Control of the target craft may be effected by manual operation of the "control stick" mounted on Control Box C-16/TRW-1. This unit controls the tone modulation frequency of BC-493-A and results in the transmission to the target craft of different tones for each of the (five) control movements or functions desired ("up", "down", etc.).

Test Unit TS-25/VRW-1 is required for the maintenance of this equipment.

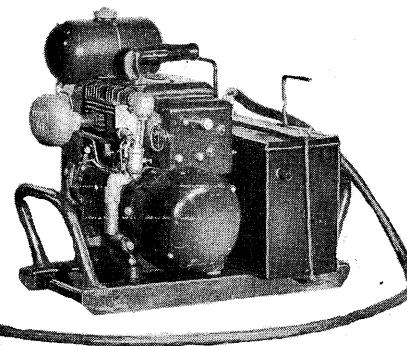
AN 08-10-235 is the HMI for AN/TRW-1.

POWER INPUT	400 w, 14 v d-c
POWER OUTPUT	20 w
FREQUENCY	67.0 - 74.0 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	5 miles maximum, 2 1/2 miles normal

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	815	8	12J5GT
2	6L6G	2	12SN7GT
2	6V6GT	1	OD3/VR-150



Transmitting Equipment AN/TRW-1



TARGET CONTROL TRANSMITTING EQUIPMENT AN/TRW-1

TOTAL WEIGHT 390 LB

Component	Nomenclature	Size	Weight
Antenna	AN-129-A	52" long	
Chest	CH-174-A	31" x 25" x 34"	127 Lb
Control Box	C-16/TRW-1	7" x 7" x 8"	2 Lb
Dynamotor Unit	PE-126-A	9" x 6" x 9"	
Mounting	FT-443-A		1 Lb
Mounting	FT-442		3 Lb
Mounting	FT-462-A		3 Lb
Radio Modulator and Transmitter	BC-463-A	10" x 16" x 21"	35 Lb
Power Unit	PE-96-A		183 Lb
Cord	CD-868-B	8" long	
Cord	CD-869-A	27" long	
Cord	CD-870	100' long	
Cord	CD-870	15' long	
Cord	CD-871	20' long	

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AN/VRW-1

Target Control Receiving Equipment AN/VRW-1 consists of a radio receiver and auxiliary equipment designed for installation in waterborne or vehicular targets and used for the remote control of such targets during gunnery and bombing practice. AN/VRW-1 is controlled by and operates in conjunction with Target Control Transmitting Equipment AN/TRW-1. The equipment consists of the major components of Target Control Receiving Equipment RC-57-() differing only in mounting bracket, cabling and the antenna.

The operating frequency of the receiver may be set to any one of four frequencies within the band of 67 to 74 Mc.

Manual operation of the "control stick" at the transmitting station (AN/TRW-1) will result in the transmission to the target plane of different tones for each of the (five) control movements or functions desired, ("up," "down," etc.) Receiver-Selector (BC-464) includes a five channel audio filter selector circuit for discrimination between the various tones received, and a complex relay circuit for passing resulting control voltages to the control surfaces mechanism of the plane.

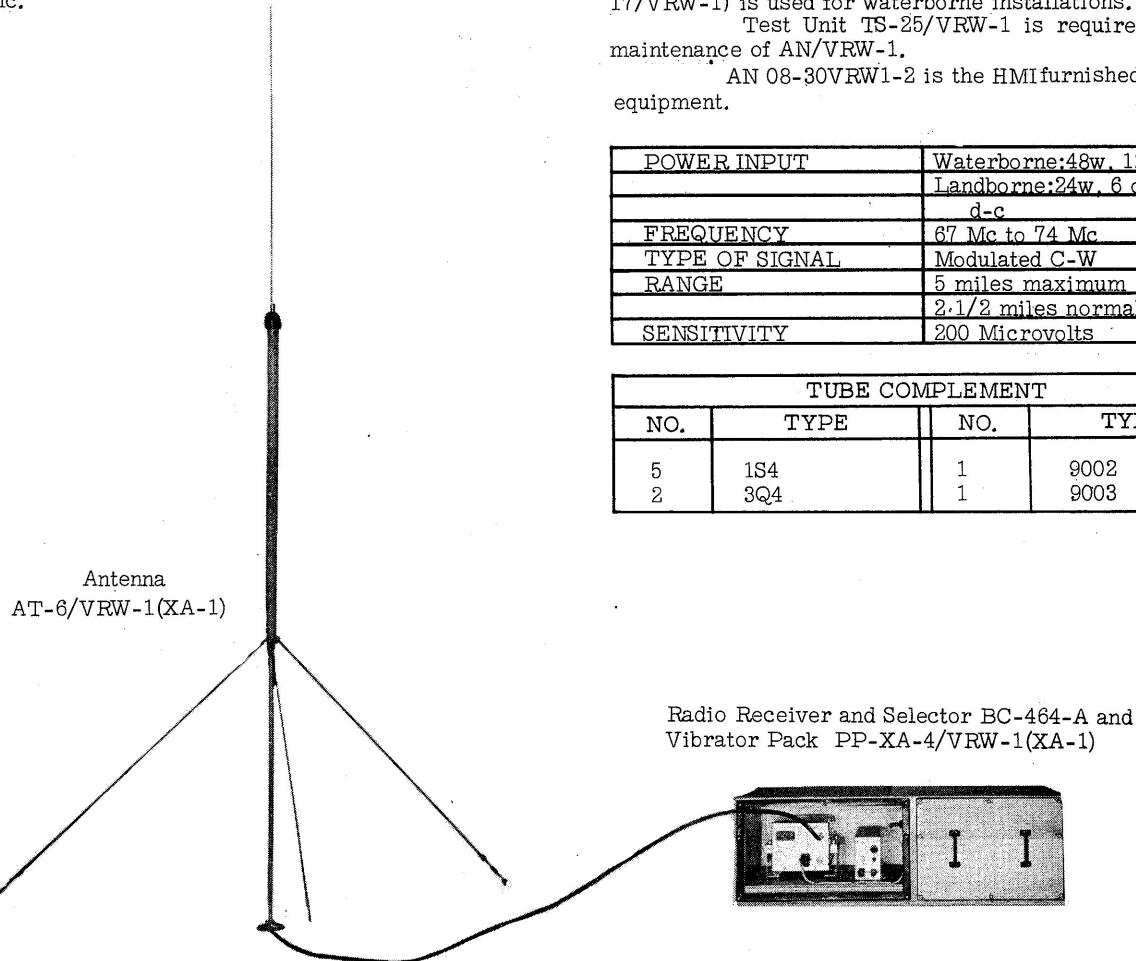
The operational power required is obtained from the target's power source. A vibrator pack (PP-3/VRW-1) is used for landborne installation while a power unit (PU-17/VRW-1) is used for waterborne installations.

Test Unit TS-25/VRW-1 is required for the maintenance of AN/VRW-1.

AN 08-30VRW1-2 is the HMI furnished with this equipment.

POWER INPUT	Waterborne: 48w, 12v d-c Landborne: 24w, 6 or 12v, d-c
FREQUENCY	67 Mc to 74 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	5 miles maximum
SENSITIVITY	2 1/2 miles normal 200 Microvolts

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
5	1S4	1	9002
2	3Q4	1	9003



TARGET CONTROL RECEIVING EQUIPMENT AN/VRW-1

TOTAL WEIGHT 35 LB

Component	Nomenclature	Size	Weight
Antenna Assembly	AT-6/VRW-1	9" high 4" dia	9 Lb
Control Box	C-16/TRW-1	5" x 5" x 2"	2 Lb
Vibrator Pack or Power Unit	PP-3/VRW-1	10" x 4" x 5"	5 Lb
PU-17/VRW-1		8" x 9" x 4"	11 Lb
Mounting	MT-34/VRW	4" x 4" x 1"	1 Lb
Mounting	MT-44/VRW-1	4" x 4" x 1"	1 Lb
Radio Receiver and Selector	BC-464-B	9" x 6" x 8"	5 Lb
Tuning Unit	TU-55()	2" x 3" x 4"	1 Lb
Mounting	MT-60/VRW-1	5" long 5" dia	3 Lb
Guy Set	AB-4/VRW-1		2 Lb
Cord	CX-13/VRW-1	12" long	
Cord	CD-869	20" long	
Cord	CX-1/VRW-1		
Cord	CD-870		
Mounting Bracket	MT-41/VRW-1	3" x 1" x 1"	

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RC-56-A

Target Control Transmitting Equipment RC-56-A is a radio transmitter and auxiliary equipment used for the remote flight control of an airplane target during gunnery practice. It is operated in conjunction with Target Control Receiving Equipment RC-57-() or AN/ARW-26-(). Control may be accomplished from watercraft, vehicular or land stations as required.

The operating frequency of the transmitter (BC-463-A) may be set to any one of four predetermined frequencies within the band of 67 to 74 Mc. The frequency used depends on the number of similar systems in operation at any one location.

Control of the target craft may be effected by manual operation of the "control stick" mounted on Control Box BC-1272. This unit controls the tone modulation frequency of BC-493-A and results in the transmission to the target craft of different tones for each of the (five) control movements or functions desired ("up", "down", etc.). Although only one control box is required for the operation

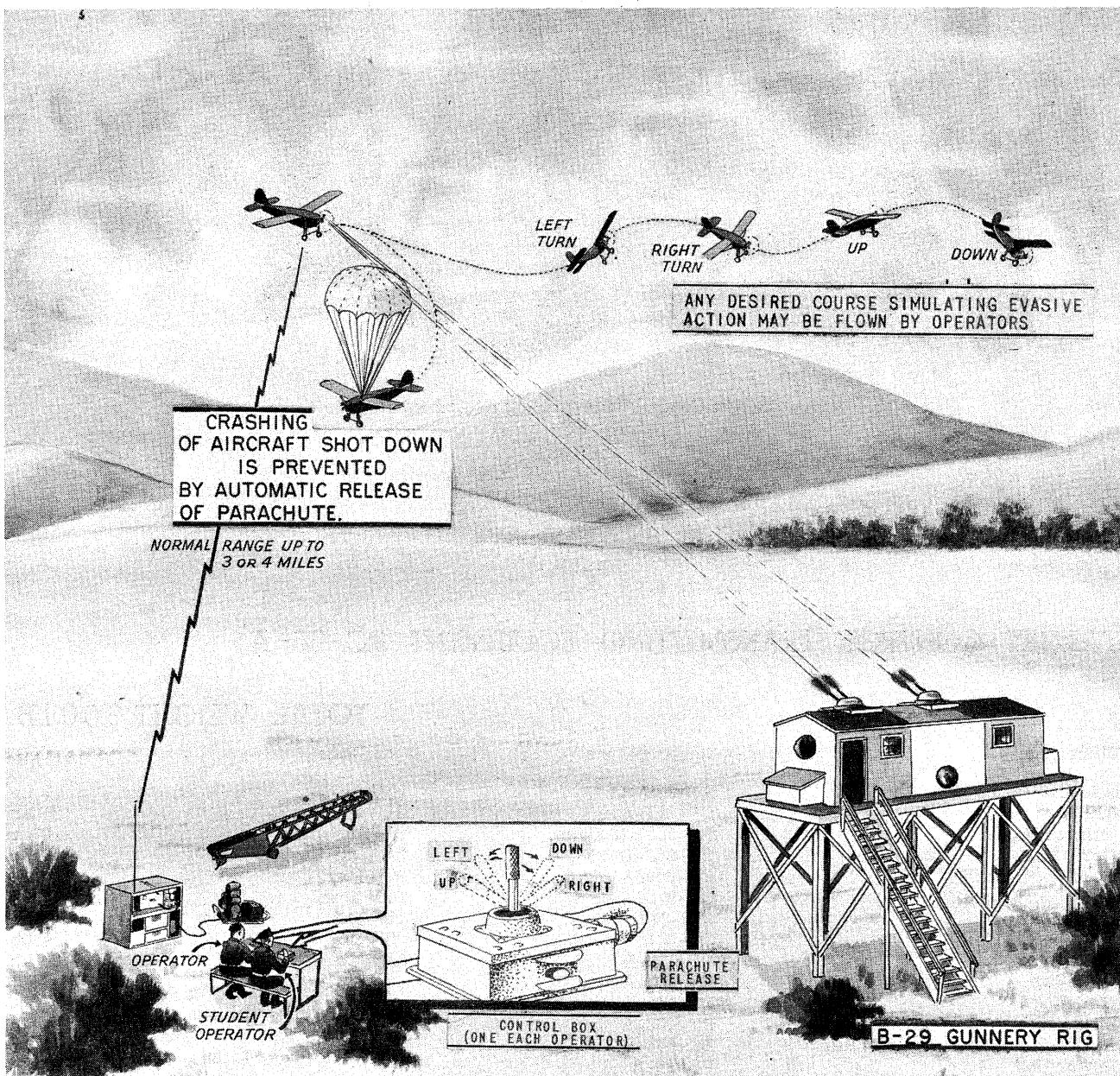
of this equipment, two boxes are supplied, one for the instructor and one for the student operator.

The test equipment recommended for this unit is IE-61-A.

AN 08-10-82 is the HMI for this system.

POWER INPUT	325 w, 14 v d-c
POWER OUTPUT	20 w
FREQUENCY	67 - 74 Mc
TYPE OF SIGNAL	Modulated C-W
RANGE	3 to 4 miles, normal 10 miles maximum

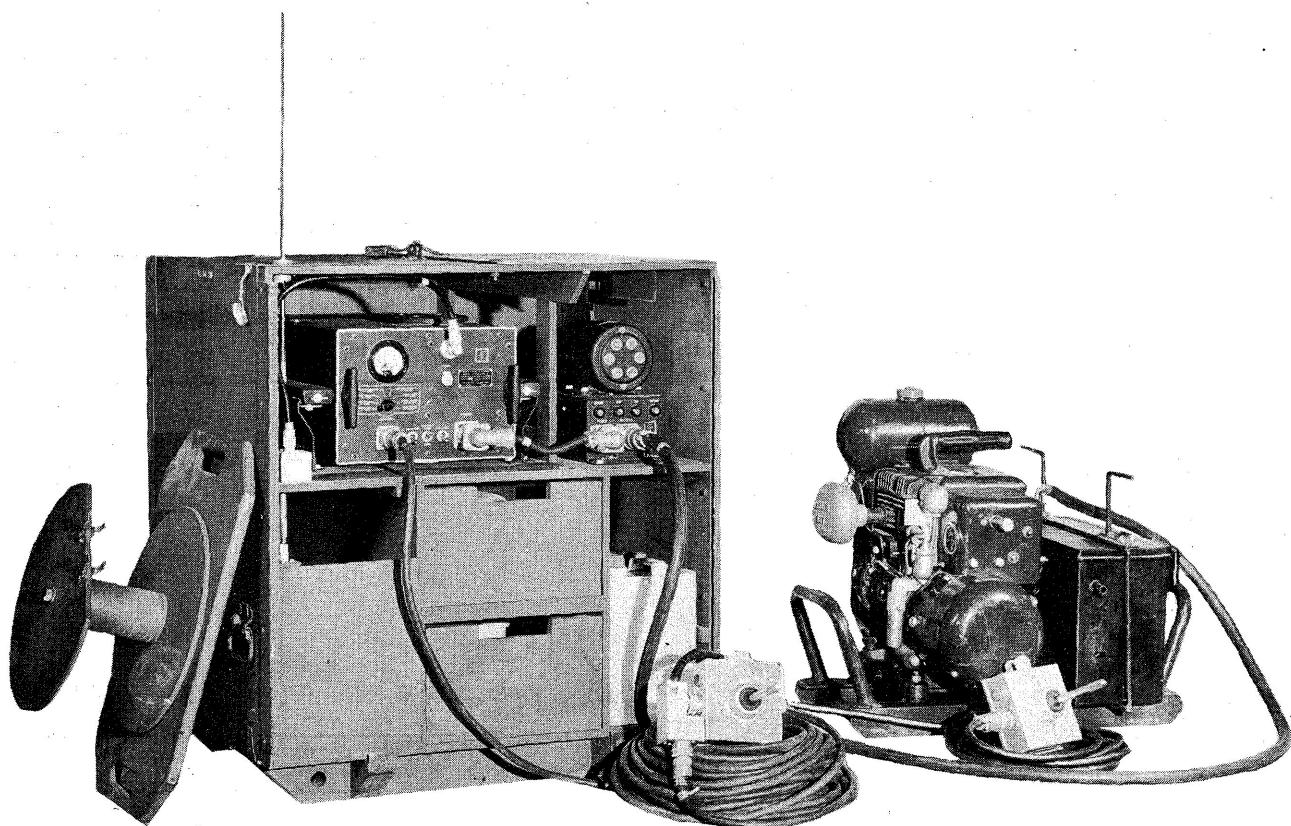
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	815	8	12J5GT
2	6L6G	2	12SN7GT
2	6V6GT	1	OD3/VR-150-30



Target Control Transmitting Equipment RC-56 is a ground remote control station used in conjunction with airborne Target Control Receiving Equipment RC-57 to control target aircraft.

RC-56-A

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Target Control Transmitting Equipment RC-56-A

TARGET CONTROL TRANSMITTING EQUIPMENT RC-56-A

TOTAL WEIGHT 300 LB

Component	Nomenclature	Size	Weight
Antenna	AN-129-A	57"	1 Lb
Chest	CH-174-A	31" x 26" x 35"	25 Lb
Control Box	BC-1272 (2 each)	6" x .7" x 8"	2 Lb
Cord	CD-868-B	8" long	1 Lb
Cord	CD-869-A	27" long	*
Cord	CD-870	100' long	17 Lb
Cord	CD-870	15' long	3 Lb
Cord	CD-871	20' long	5 Lb
Dynamotor	PE-126-B	6" x 11" x 9"	20 Lb
Mounting	FT-443-A		
Mounting	FT-442-A		
Mounting	FT-462-A		
Radio Modulator & Transmitter Power Unit	BC-463-B PE-96-A	22" x 16" x 10"	46 Lb 183 Lb

Also includes maintenance parts set and tool equipment.

* Weight less than 1 lb.

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RC-57-B

Target Control Receiving Equipment RC-57-B consists of a radio receiver and auxiliary equipment designed for installation in target aircraft to control the elementary movements of the plane for gunnery practice. It operates in conjunction with Target Control Transmitting Equipment RC-56-().

The operating frequency of the receiver may be set to any one of four preset frequencies within the band of 67 to 74 Mc. The frequency used depends on the number of similar systems in operation at one location.

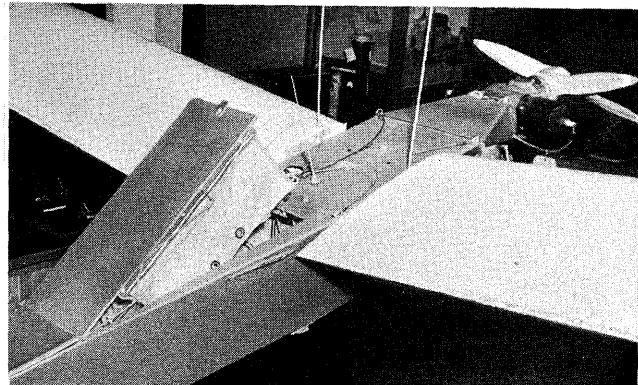
Manual operation of the "control stick" at the transmitting station (RC-56) will result in transmission to the target plane of a different tone for each of the (five) control movements or functions desired, ("up", "down", etc.). Receiver-Selector (BC-464) includes a five channel audio filter selector circuit for discrimination between the various tones received and a complex relay circuit for passing resulting control voltages to the control surfaces mechanism of the plane. Battery Box BX-28-B supplies all the power required for 1 1/2 hours of continuous operation.

Although the target control receiving equipment can be controlled from a distance beyond normal vision, the equipment is intended only for use in the normal visual range of the control operator.

Target Control Receiving Equipment RC-57-() is identical in function to Radio Receiving Set AN/ARW-26 but due to waterproofing of the latter set the components are not interchangeable as units.

Test Set TS-257()/ARW is used to maintain RC-57-B.

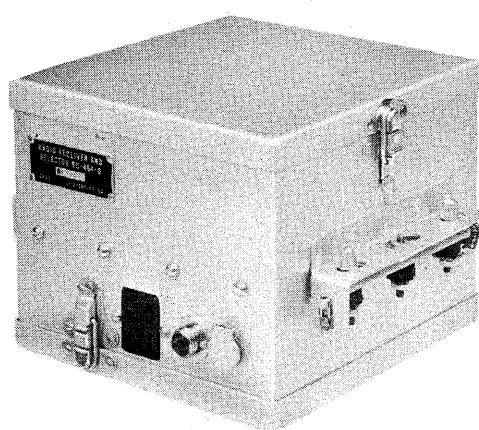
Army Air Forces Technical Order AN 08 - 40RC57-2 is the HMI for this equipment.



Target Aircraft OQ-2A- One of the series of target aircraft remotely controlled by this equipment.

POWER INPUT	(2) 6 v Batteries (3) 67 1/2 v Batteries
FREQUENCY	67 - 74 Mc
TYPE OF SIGNAL	Modulated CW
RANGE	10 miles maximum 3 - 4 miles normal
RECEIVER SENSITIVITY	200 microvolts

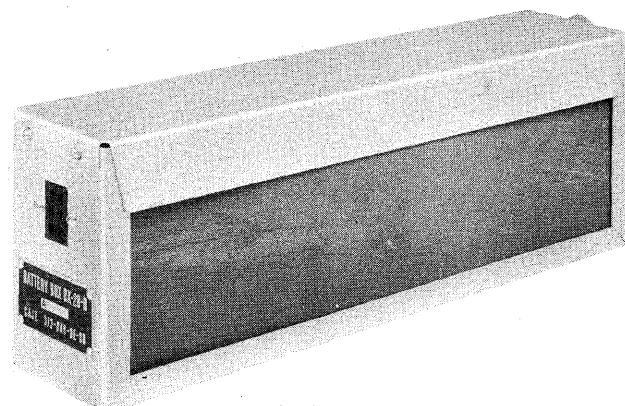
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
5	1S4	1	9002
2	3Q4	1	9003



Radio Receiver and Selector
BC-464-D



Antenna
AN-127-B



Battery Box
BX-28-B

TARGET CONTROL RECEIVING EQUIPMENT RC-57-B

TOTAL WEIGHT 12 LB

Component	Nomenclature	Size	Weight
Antenna	AN-127-B	Length 13" x Dia 2"	0.3 Lb
Battery Box	BX-28-B	9" x 3" x 5"	6 Lb
Radio Receiver and Selector	BC-464-D	1" x 5" x 6"	5 Lb
Mounting	FT-441-A (2 each)		
Tuning Unit	TU-55		
Cord	CD-867		

RC-57-B also includes plugs, insulating bushings, terminal and package of maintenance parts.

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RC-64-()

Target Control Receiving Equipment RC-64-() consists of a F-M radio receiver and auxiliary equipment designed for installation in target aircraft to control the elementary movements of the target craft during gunnery practise. It operates in conjunction with Target Control Transmitting Equipment RC-65-().

The operating frequency of the receiver may be set between the limits of 30 to 40 Mc; however the normal setting is 38.54 Mc with an alternate frequency of 35.3 Mc.

Manual operation of the "control stick" at the transmitter (RC-65) will result in transmission of certain tones to the target plane for each control movement or function desired ("up", "down", etc.). Receiver-Selector (BC-617) includes a ten channel audio filter selector circuit for discrimination between the various tones received. Relay Unit BC-622 passes control voltages to the target plane control surfaces mechanism from the receiver output.

Relay Unit BC-418-() is a safety feature that causes the plane to slowly climb and turn right should RC-65-() fail. It is only used when the target airplane is flown without a safety pilot.

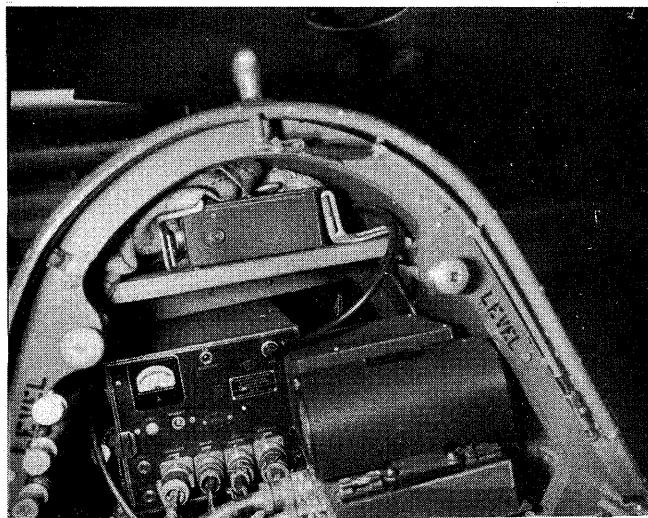
Target Control Receiving Equipment RC-64-Z is similar to Target Control Receiving Equipment RC-64 except that it is designed for 12 volt operation.

RC-64-AZ is similar to RC-64-Z except that it is built to service specification. RC-64-T5 and RC-64-T9 are similar to RC-64 except that they contain only eight control channels.

Test Equipment required for this unit consists of the following:

I-201	Test Unit	-	Class A
BC-914	Test Unit	-	Class A
TS-297/U	Multimeter	-	Class A
FD-10	Doolittle Model (Monitor)	-	Class A
TS-382/U	Audio Oscillator	-	Class B
TS-375/U	Voltmeter	-	Class B
TS-239/UP	Oscilloscope	-	Class B
I-177	Tube Tester	-	Class B
I-208	Signal Generator	-	Class B
I-176	Multimeter	-	Class B

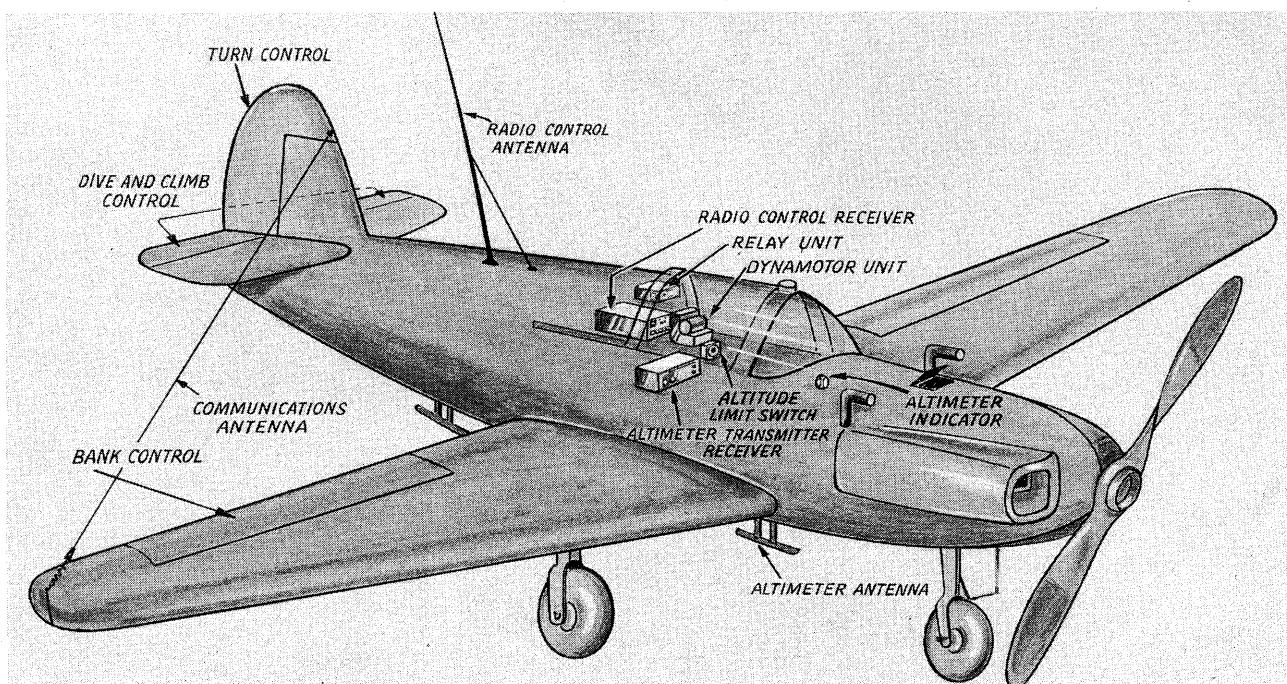
Army Air Forces Handbook of Maintenance Instructions for RC-64-Z is AN 08-40RC64-Z.



Installation of Receiving Equipment RC-64 in PQ-14A Target Aircraft

POWER INPUT	96 w, 12 v, d-c 96 w, 14 v, d-c
FREQUENCY	30 - 40 Mc
TYPE OF SIGNAL	F-M
RANGE	10 miles from air 1 mile from ground
SENSITIVITY	RC-64-AZ RC-64-Z
	15 microvolts 30 microvolts

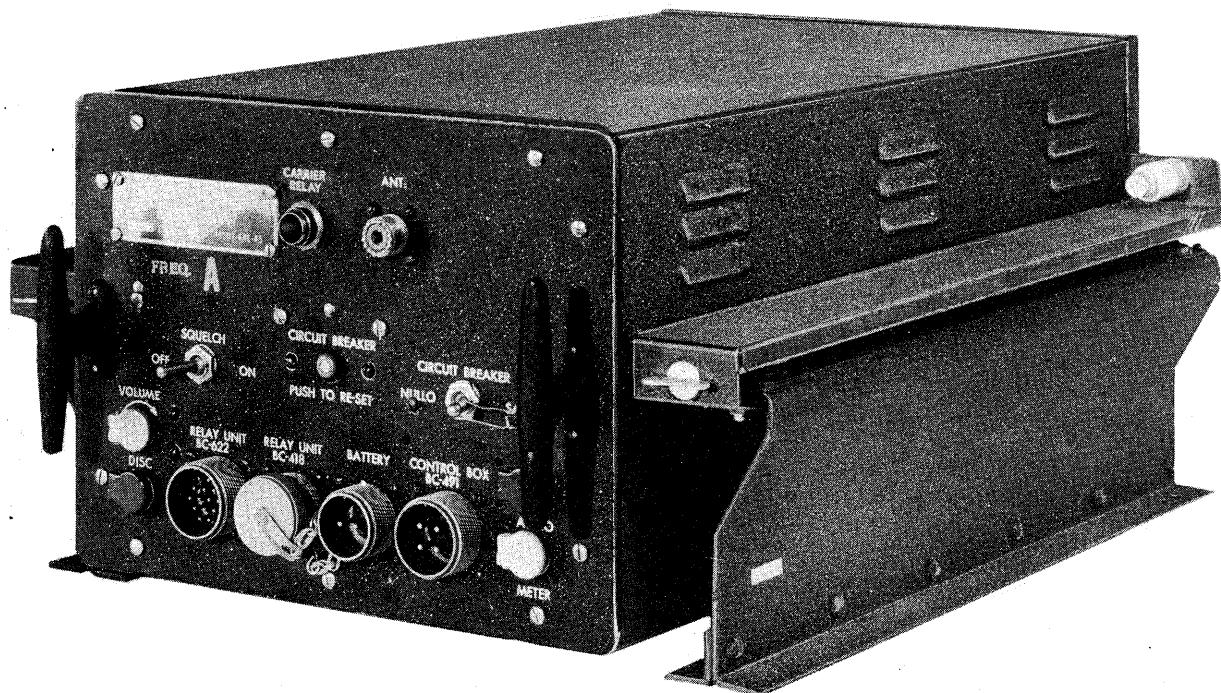
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3	12SK7	1	12J6GT
1	12SA7	1	12SL7GT
2	12SJ7	6	12SN7GT
1	12H6		



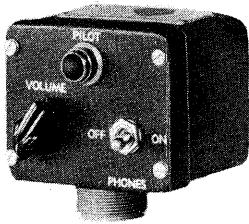
Target Control Receiving Equipment RC-64-() designed to control the flight movements of target aircraft during gunnery practice.

RC-64-C

UNCLASSIFIED



Radio Receiver-Selector R-154(XA)/ARW



Radio Control Box BC-491

TARGET CONTROL RECEIVING EQUIPMENT RC-64-C

TOTAL WEIGHT 72 LB

Component	Nomenclature	Size	Weight
Antenna	Length 6 feet	AN-117-A	1 Lb.
Mounting	8" x 5" x 3"	FT-440	
Relay Unit	8" x 7" x 4"	BC-418-Z	8 Lb
Mounting	17" x 2" x 5"	FT-462-A	
Mounting	17" x 2" x 5"	FT-442-A	
Radio Control Box	3" x 3" x 3"	BC-491-Z	1 Lb.
Radio Receiver and Selector	8" x 15" x 20"	BC-617-Z	42 Lb
Relay Unit	3" x 9" x 8"	BC-622-AZ	5 Lbs

RC-64 also includes clip, plugs, adapters, ferrule, insert, tags insulator, wire and radio frequency cables.

UNCLASSIFIED

RC - 65 -()

Target Control Transmitting Equipment RC-65 consists of an F-M radio transmitter and auxiliary equipment used for the remote flight control of a target airplane during gunnery practice. It is operated in conjunction with Target Control Receiving Equipment RC-64-() which is normally installed in target airplanes such as the PQ-14.

The operating frequency of Radio Modulator and Transmitter BC-925 may be set between the limits of 30 to 40 Mc. However the normal setting is 38.54 Mc with an alternate frequency of 35.3 Mc. The modulator has ten channels each of which may tone-modulate the output carrier frequency at a given audio frequency.

Control may be effected from the ground or another aircraft by manual operation of Control Box BC-756. This results in the transmission of certain tones to the target plane for each control movement or function desired ("up", "down", etc.).

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	12SL7GT	2	12SA7
4	12SJ7	2	12A6
8	12SN7GT	1	1625

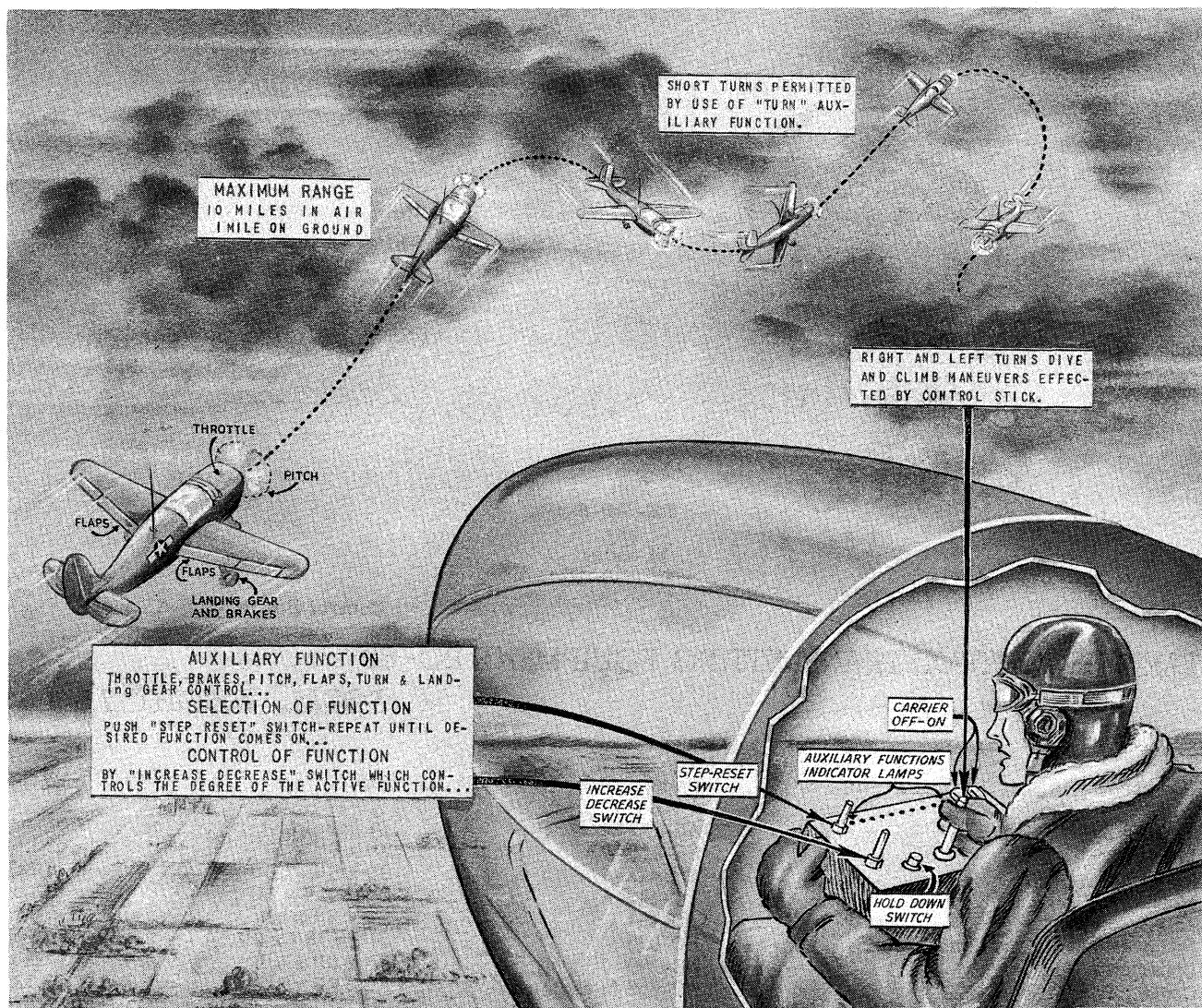
Target Control Transmitting Equipment RC-65-Z is similar to RC-65 but requires a 14 volt d-c power source.

Test Equipment required for maintaining these systems include:

I-204	Test Unit	-	Class A
BC-914	Test Unit	-	Class A
TS-297/U	Multimeter	-	Class A
TS-382/U	Audio Oscillator	-	Class B
TS-375/U	Voltmeter	-	Class B
TS-239/UP	Oscilloscope	-	Class B
I-177	Tube Tester	-	Class B
TS-118/AP	Wattmeter	-	Class B
TS-174/U	Frequency Meter	-	Class B
I-176	Multimeter	-	Class B

AN 08-40RC65-2 is the HOM and AN 08-40RC65-3 is the HMI for RC-65 and RC-65-Z.

POWER INPUT	235 w, 28 v, d-c 230 w, 14 v, d-c
POWER OUTPUT	20 w
TYPE OF SIGNAL	F-M
RANGE	10 miles air to air 1 mile ground to air



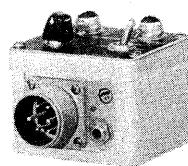
Target Control Transmitting Equipment RC-65 is designed for the transmission of control signals to a target or full scale aircraft, for the flight control of such aircraft, by an operator on the ground or in another aircraft.

RC-65 ()

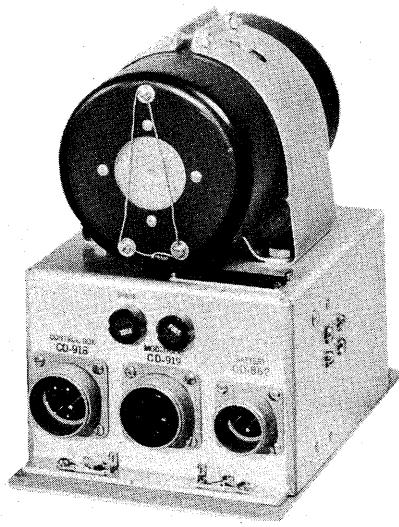
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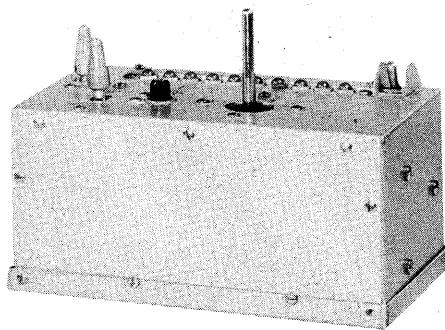
Radio Modulator and
Transmitter BC-925



Radio Control Box BC-494



Dynamotor
Unit
PE-180-A
on
Mounting
FT-443-A



Control Box BC-756-A

TARGET CONTROL TRANSMITTING EQUIPMENT RC-65

TOTAL WEIGHT 75 LB

Component	Nomenclature	Size	Weight
Antenna	AN-117-A	Length 6 feet	
Mounting	FT-462-A	2 1/16" x 6 1/16" x 18 1/16"	3 Lbs.
Mounting	FT-442-A	2 1/16" x 6 1/16" x 18 1/16"	3 Lbs
Mounting	FT-443-A	6 1/16" x 11 1/16" x 1 1/16"	1 Lb
Radio Control Box	BC-494	3 1/16" x 3 1/16" x 4 1/16"	1 Lb
Radio Modulator and Transmitter	BC-925	21 1/16" x 16 1/16" x 9 1/16"	35 Lbs
Dynamotor Unit	PE-180	9 1/16" x 6 1/16" x 8 1/16"	15 Lbs
Control Box	BC-756 (2 each)	5 1/16" x 6 1/16" x 8 1/16"	8 Lbs

RC-65 also includes clip, plugs, adapters, wire, ins
frequency cable.

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